



# From Data to **Decisions**

Scaling Analytical Capabilities in a Distributed Environment

# IT Forum

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# Supporting Members in Best Practice Implementation

## Resources Available Within Your Membership

This publication is only part of our work to assist members in decision support. Recognizing that ideas seldom speak for themselves, our ambition is to work actively with members of the IT Forum to decide which practices are most relevant for your organization, to accelerate consensus among key constituencies, and to save implementation time.

For additional information about any of the services below—or for an electronic version of this publication—please visit our website ([eab.com/itf](http://eab.com/itf)), email your organization’s dedicated advisor, or email [research@eab.com](mailto:research@eab.com) with “IT Forum ‘From Data to Decisions’ Request” in the subject line.

### Implementation Road Maps and Tools

Tools and templates corresponding to the practices in this study are available in the toolkit at the back of this book. These and additional tools are also available on our website at [eab.com](http://eab.com).

### Recorded and Private-Label Webconference Sessions

Our website includes recordings of webconferences walking through the practices highlighted in this publication. Forum experts are also available to conduct private webconferences with your team.

### Unlimited Expert Troubleshooting

Members may contact the consultants who worked on any report to discuss the research, troubleshoot obstacles to implementation, or run deep on unique issues. Our staff conducts hundreds of telephone consultations every year.

### Facilitated Onsite Presentations

Our experts regularly visit campuses to lead half-day sessions focused on highlighting key insights for senior leaders or helping internal project teams select the most relevant practices and determine next steps.



All IT Forum resources are available to members in unlimited quantity.

**To order additional copies of this book**, or to learn about our other services, please visit us at [eab.com](http://eab.com) or contact us at 202-266-6400.

# Related Research

## EAB IT Forum's Research on Data Governance and Data Management

### A Common Currency

*Achieving Excellence in Data Governance and Adoption of Analytics*

#### Data Governance for Performance Management

- Institutional Ownership of Data
- Bicameral Data Governance Committees
- Fast-Cycle Decision Frameworks
- Pop-Up Data Dictionaries

#### Data Quality Tolerance

- Accountable Data Stewards
- Automated Data Quality Testing
- Fast-Turnaround Error Check Reports
- Unit-Level Data Quality Scorecards
- User-Friendly Data Entry Instructions

#### Hardwiring Data Access Provisions

- Data Security Classification Framework
- Role-Based Data Access Rights
- HRIS Access Rights Coding

#### Maximizing Report Relevance

- BI Merchandizing
- Personalized Recommendation Engine
- Demand-Driven Report Enhancement
- Unit-Level BI Roadmaps
- Crowdsourced Innovation
- Low-Cost Bridge Workaround

#### Organizational Continuity

- Centralized BI Group
- Chief Data Steward

### A Common Currency Toolkit



Visit the online toolkit to download resources to assist with implementation of tactics. Example resources include job descriptions, organizational charts, role-based data access privilege models, and a business intelligence readiness assessment.

To learn more, visit: [eab.com/itf/2015/commoncurrency](http://eab.com/itf/2015/commoncurrency)

# Executive Summary

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## Challenges to Successful Decision Support Rampant

**Though higher education institutions have been investing in data sources for years, campus members still consider themselves underserved in terms of decision support.** Over the last two decades, individual campuses have spent tens of millions of dollars on major enterprise resource planning (ERP) systems and other point solutions for data collection. More recently, campuses have begun investing more in data warehouses for data aggregation. Yet many campus members question the return-on-investment of such endeavors because they still struggle to obtain the data they need to improve their decision making.

### Higher Education Recognizes the Need for Decision Support

“At [Arizona State University], I could see that we would not be able to innovate fast enough without analytics. Without analytics, we can't understand what's going on, we can't understand the complexity of what we're trying to do, and we can't measure our progress. We needed tools to help us make better decisions—about everything... Every facet of the institution requires robust analytics.”

*Michael Crow  
President  
Arizona State University*

**On many campuses, decision support teams are overburdened and fail to keep up with decision makers' needs and expectations.** Institutional Research (IR) offices typically focus on meeting external reporting requirements rather than on conducting their namesake practice. Emerging business intelligence teams often struggle to identify campus members' needs and to deliver decision support from a central perspective. This led one CIO to note, “The university's two most important assets are human resources and data. Data's been vastly underleveraged and the urgency for analytics and improved decision support has never been higher.” To improve decision support in a scalable manner across the institution, campus leaders must:

- 1 Enhance the User-Friendliness of Self-Service Resources
- 2 Promote Single Versions of the Truth
- 3 Upskill Distributed Analytics Staff

Source: Michael Crow, Renee A'Hearn, and Jameela A-mohanadi, “No More Excuses: Michael M. Crow on Analytics,” EDUCAUSE (2012); EAB interviews and analysis.

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## Enhancing the User-Friendliness of Self-Service Resources

**Campus members often overburden central decision support teams with basic data requests, crowding out strategic work.** Central decision support teams estimate that anywhere from 25 to 100 percent of their capacity is dedicated to responding to ad hoc data requests, many of which are for basic institutional data such as enrollment figures. These requests come at significant opportunity cost, as they crowd out decision support teams' ability to work on more strategic predictive analytics for campus members.



**Enhance the user-friendliness of self-service resources to move from an undisciplined “pull” climate for campus member queries to a scalable “push” environment for analytical resources.** To improve the access and usability of analytical resources for self-service, central decision support, teams should:

*Provide basic facts and figures through easy-to-operate and understand data visualization tools*



Institutional Factbook Configurator



Pop-Up Data Presentation Prompts



Role-Based Recommendation Engines



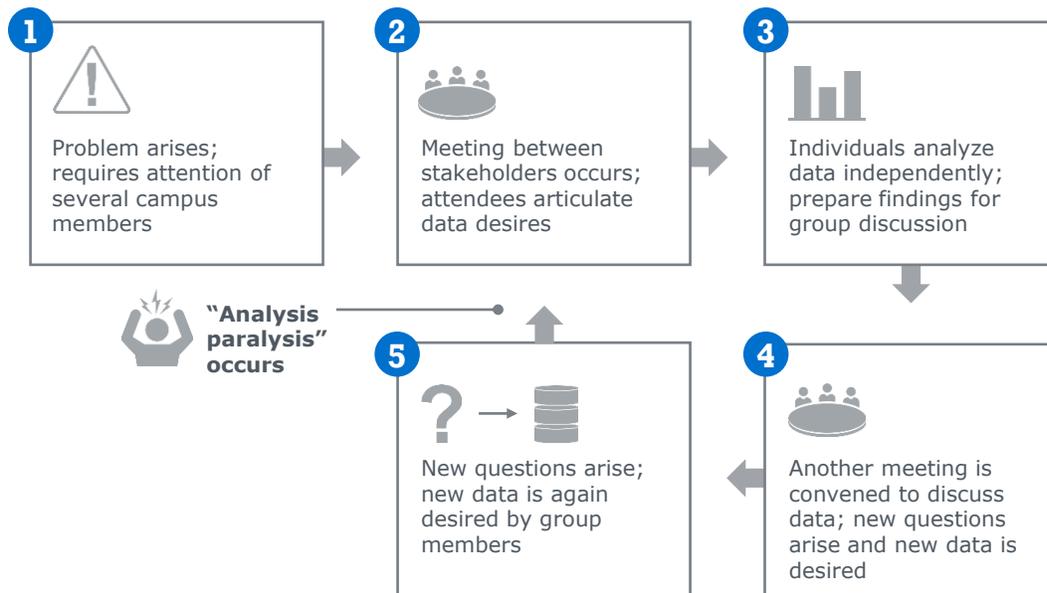
Crowdsourced Report Use Guides

Source: EAB interviews and analysis.

## Promoting Single Versions of the Truth

**Highly analytical environments, such as higher education, foster skepticism of data.** Campus members often desire “perfect” data, which rarely exists because of collection problems or data governance issues. While directionally-correct data is suitable for most decision making purposes, denial of data or pursuit of better data often leads to analysis paralysis and the lack of any data-informed decisions.

### Succumbing to ‘Analytical Swirl’ from an Insatiable Desire for Data



**Promote single versions of the truth to move beyond data skepticism.** Departments may have valid reasons for data definitions that diverge from institutional definitions but these differences are too often used as reasons for data denial and reliance on intuition for decision making purposes. To help the campus move beyond skepticism of available data, central decision support teams should:

*Provide a consolidated set of analytical resources with increased visibility into underlying data validity*

*Establish a set of agreed-upon departmental metrics for decision making purposes (e.g., program review)*

Data Quality Assurance Certification

Demand-Driven Report Maintenance

Standardized Program Evaluation Metrics

Semi-customizable Department Scorecards

Source: EAB interviews and analysis.

# Upskilling Distributed Analytics Staff

**As desire for more data and analytics increases, central decision support teams struggle to satiate campus members' data needs.** Functional units respond by hiring technical staff to retrieve and manipulate data. While these staff possess local functional knowledge, they lack the institutional data architecture perspective of central decision support staff and advanced decision support skills such as data modeling and visualization.

## Demand for Data Only Growing Among Campus Leaders...



**80%**

of deans and department chairs expected their use of analytics to increase from 2014 to 2015

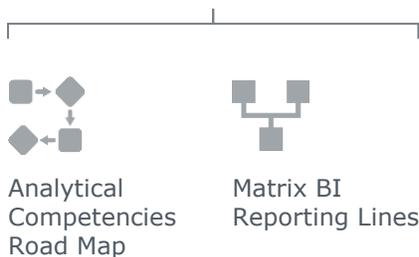
## ...But Distributed Data Skill Sets Insufficient for Most Decision Makers' Needs<sup>1</sup>

Skill	Current: Programmer	Desired: Analyst
Data Retrieval and Manipulation	●	◐
Project Management	◐	◐
Data Analysis	○	●
Communication	○	●



**Upskill distributed analytics staff to relieve the reporting burden of central decision support teams while improving functional decision support capabilities.** Distributed analytics staff typically operate in isolation from each other and the central decision support team, leading to suboptimal assistance to decision makers. To improve decision support at scale, central decision support teams should:

*Create a plan for hiring, retaining, and overseeing distributed analytics staff*



*Augment technical skills with decision support skills*



*Form communities of practice for analytics staff to learn from and interact with one another*



1) Illustrative.

# Understanding Your Current Practice

The following questions are designed to help you evaluate your current practices. Use them to determine which of the strategies presented are more relevant to your institution.

<b>Enhancing the User-Friendliness of Self-Service Resources</b>	<b>Yes</b>	<b>No</b>
Would campus members agree that basic facts and figures are easily accessible (e.g., student enrollment by ethnicity, number of faculty per college)?		
Does the decision support team provide guidance to campus members about which analytical resources may be most helpful to them?		
Would you consider most decision makers fluent in the use of data and knowledgeable about how to apply institutional reports to their decision making needs?		

*If you answered "No" to any of these questions, please turn to pages 27-44*

<b>Promoting Single Versions of the Truth</b>	<b>Yes</b>	<b>No</b>
Do analytical resources provide any indication of the underlying validity of data for decision making purposes?		
Do campus members feel overwhelmed by the number of reports and dashboards available to them or concerned that analytical resources disagree with each other?		
Are campus decision makers able to compare programs against a set (or a subset) of standardized metrics?		

*If you answered "No" to any of these questions, please turn to pages 45-62*

<b>Upskilling Distributed Analytics Staff</b>	<b>Yes</b>	<b>No</b>
Do functional units know the right skills to look for when hiring distributed analytics staff?		
Is there a formal organizational relationship between central decision support teams and distributed analytics staff?		
Do distributed analytics staff resemble decision support specialists (skilled in data modelling and visualization) rather than programmers (skilled in data retrieval)?		
Are there in-person and online networks for distributed support specialists to teach each other about successful uses of analytics or help solve each others' problems?		

*If you answered "No" to any of these questions, please turn to pages 63-84*



# The Current State of Decision Support in Higher Education

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INTRODUCTION



# The Goal: Decision Support, Not Data Support

## Fundamentals of Analytics Only Get Us So Far

Previous EAB research focused on one of the fundamental aspects of analytics—data management (see page 6 for more details). Without common data definitions, trusted data quality, and timely access to data, campus members struggle to incorporate data into decision making.

However, campus members ultimately desire faster decisions that enable better outcomes. A better data infrastructure, while important, often means little to data consumers, who only interact with the end product.

With increasing demand from many campus leadership teams to become more “data-informed,” the pressure is falling on CIOs to improve campus decision making.

### Data Management: An Important Step in the Right Direction...



#### Sustainable Data Governance

- Institutional ownership of data
- Common data definitions



#### Improved Data Quality

- Poor quality data identification
- Standardized entry processes



#### Role-Based Data Access Models

- Scalable methods for permissions
- Less subjective criteria for access

### ...But Better Data Doesn't Mean Better Decisions



#### Perfect Data Warehouse

- All-encompassing
- Clean data



#### Better Decisions

- More-informed
- Made faster
- Better outcomes



“When it comes to setting the course for the university, it is critical that decisions be made using the most current and relevant data possible.”

*Sam Houston State University  
Office of the President  
Performance Report*

# Decision Support's Importance Outpacing Capabilities

## Findings from EAB's IT Functional Diagnostic

Results from EAB's IT Functional Diagnostic indicate that CIOs believe they are underperforming on decision support and data governance.

EAB's IT Functional Diagnostic measures how CIOs perceive their institutions' maturity (level of performance) and importance (need to improve over the next two years) regarding 29 key higher education IT capabilities.

A positive "gap score" (maturity minus importance) for a capability indicates confidence in current levels of

performance; a negative gap score indicates need for improvement.

Unsurprisingly, with all the pressure on CIOs to improve analytical competencies, decision support and data governance claimed the largest average performance gaps as well as the highest overall average importance scores.



**Take the EAB IT Functional Diagnostic**

To learn more about the IT Functional Diagnostic and how to identify where your IT function has the largest functional gaps across 29 key capabilities, access the diagnostic:  
[eab.com/tools-and-analytics/eab-it-functional-diagnostic](http://eab.com/tools-and-analytics/eab-it-functional-diagnostic)

### Importance Gap Highlights Areas in Need of Improvement

Gap (Maturity Minus Importance) by Importance for Higher Ed CIOs, 2015-2016

n=102



Source: EAB IT Functional Diagnostic; EAB interviews and analysis.

# Spending and Effort, but Little Progress

## Institutions Awash in Opportunities for Data Collection, Analysis

Although CIOs report a worryingly high level of concern for their lack of decision support capabilities, it is not for a lack of investment in systems or analytical solutions.

Higher education institutions have invested in ERP systems for many years, and the number of data-capturing point solutions across campus increases annually. Institutions are collecting more data than ever before. The University of Windsor witnessed a growth in data storage of 46% in 2014, largely from an increased Learning Management System (LMS) use, and some for-profit institutions collect over one terabyte of data daily from online learners.

Accordingly, the analytics tool market for higher education institutions has doubled in the past few years, with 47 vendors classified in the “analytics” category at the EDUCAUSE Annual Conference in 2015. Decision support teams have been tasked with supporting additional campus data needs, leading to a proliferation of reliance on decision support resources: some research universities are now creating over 1,000 different reports for campus members. However, more reports does not necessarily lead to better decisions.

### Tens of Millions Being Spent on Data Repositories

#### Major Systems



- SIS
- HRIS
- CRM
- LMS

#### Minor Systems



- Event Attendance Tracking
- Faculty Activity Management

#### Analytical Solutions



- BI Tools
- Data Visualization Tools
- Website Analytics
- Student Success Solutions
- Enrollment Modelling
- Space Optimization Technologies
- Procurement Benchmarking

>1,000

central data reports  
available at one research  
university

# Widespread Investments in Data and Analytics Staff

## Almost All Institutions Expecting an Increase in Size of Central BI

In addition to investments in data repositories and analytics tools, higher education institutions are growing business intelligence teams on campus and augmenting the skill sets of decision support staff.

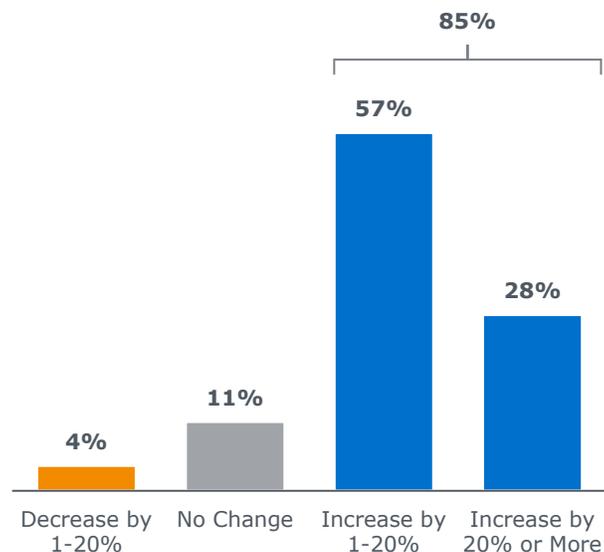
In 2014, the IT Forum found that 85% of surveyed institutions planned to increase the size of central business intelligence teams by 2017, with over one-quarter of institutions planning to grow the size of their teams by over 20%.

While decision support teams are growing in size, the skills desired for team members have evolved. As institutions focus on getting more value from existing data, demand for programming skill sets is diminishing whereas demand for data modeling and data visualization skills is growing.

### BI Teams Poised for Growth...

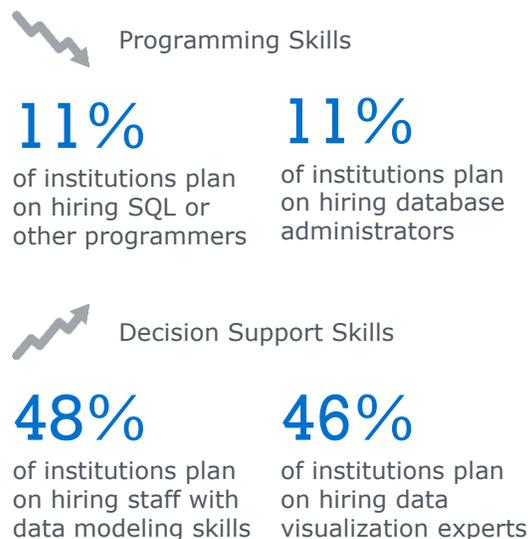
Expectation of Change in BI Staffing—  
Higher Ed CIOs, 2014 to 2017

n=45



### ...But Expecting the Bigger Lineup Will Contain Markedly Different Mix of Skills

Expectation of Change in BI Skill Sets—  
Higher Ed CIOs, 2014



Source: "Developing and Supporting Analytics Initiatives," EAB (2015); EAB interviews and analysis.

# Returns on BI Investments Falling Short of Expectations

## Investments in Decision Support Insufficient to Satisfy Campus Leaders

Although institutions are investing in systems, analytical solutions, and decision support staff, campus leaders are dissatisfied with the degree to which analytics tools improve their decision making.

According to data from Dr. Lisa Helmin Foss's dissertation, 48% of deans and department chairs disagreed or strongly disagreed that their institutions' analytics tools significantly improved decision making at their institutions.

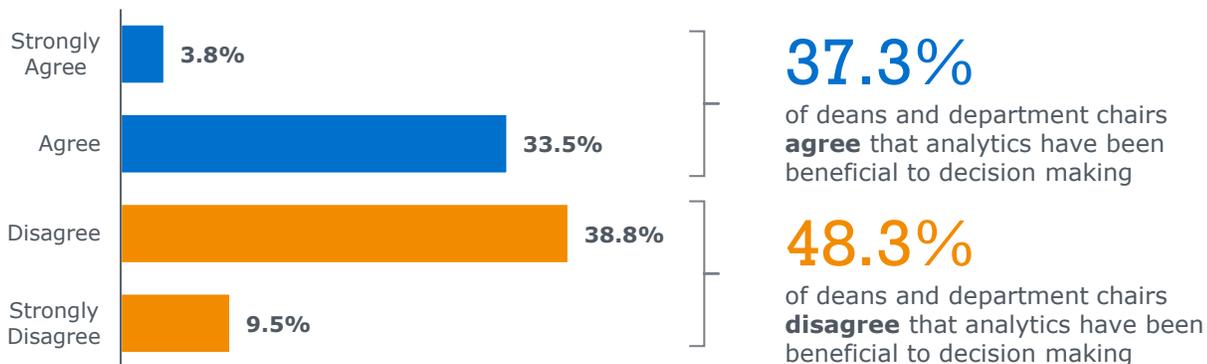
### Insight into Decision Support Perceptions of Academic Leaders

Dr. Lisa Helmin Foss, the Associate Vice President and Associate Provost for Strategy, Planning, and Effectiveness at St. Cloud State University, wrote a dissertation in 2014 entitled: "Implementing Data Analytics as an Organizational Innovation in Colleges and Universities." This dissertation provides rich insight into deans' and department chairs' perceptions of analytics in higher education and is referenced multiple times in this study.

### Deans and Department Chairs Not Finding Value in Current Analytical Capabilities<sup>1</sup>

*Level of Agreement with Data Analytics Tools Significantly Improving Decision Making at the Institution, 2014*

n=192



1) Responses of "Don't Know" were excluded from this analysis.

Source: Lisa Helmin Foss, "Implementing Data Analytics as an Organizational Innovation in Colleges and Universities," University of Minnesota Digital Conservancy (2014); EAB interviews and analysis.

# Gaps Abound Between Expectations and Performance

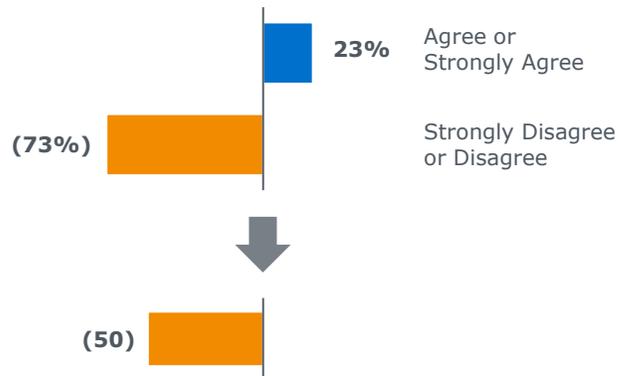
## Tools, Communications, and Resources—All Unsatisfactory

Deans' and department chairs' dissatisfactions with analytics resources indicates that the current approach is not working. The IT Forum asserts that institutions may be focusing too much on *data* at the expense of *insights*.

Further data from Dr. Helmin Foss's dissertation shows that deans and department chairs generally disagree that their institutions are providing effective tools, communications, and training for data-informed decision making. Only 21% of surveyed deans and department chairs agreed that their institutions provided appropriate professional development for how to use data in decision making, yet campus leaders are tasking these individuals with making more data-informed decisions.

### Calculating a "Gap Score"

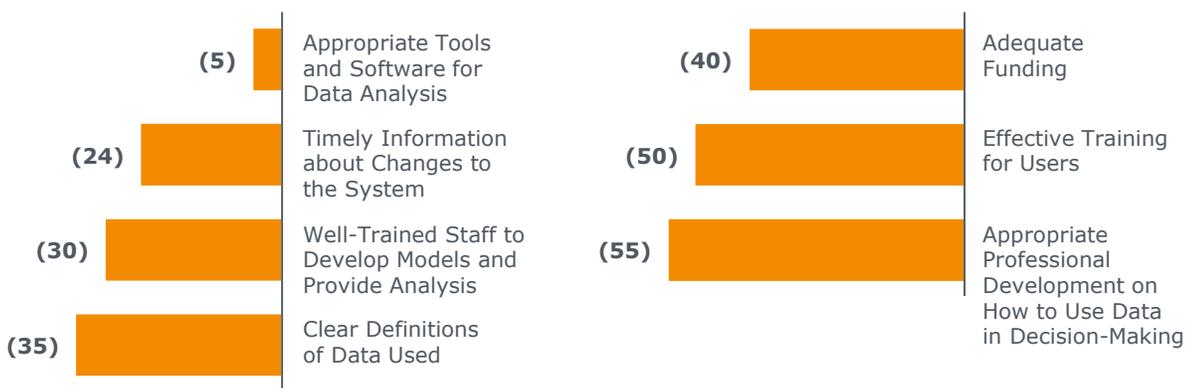
*Level of Agreement with "For Data Analytics, My Institution has Provided Effective Training for Users"*



### Decision Support Missing the Mark with Academic Leaders<sup>1</sup>

*Percentage Point Gap of Positive Responses<sup>2</sup> Minus Negative Responses<sup>3</sup> for Deans and Department Chairs' Agreement Level with Provision of Analytical Support, 2014*

n=209+



1) "Don't Know" was excluded from this analysis.  
 2) "Agree" or "Strongly Agree"  
 3) "Disagree" or "Strongly Disagree"

Source: Lisa Helmin Foss, "Implementing Data Analytics as an Organizational Innovation in Colleges and Universities," University of Minnesota Digital Conservancy (2014); EAB interviews and analysis.

# Leaders Anticipate Needing More Decision Support

## Expectations for CIOs to Deliver on Decision Support Growing in Parallel

The extensive pressure on CIOs to deliver effective and timely decision support to campus leaders is growing as campus members expect to use more data to support decision making. Almost 80% of deans and department chairs anticipate that their use of data will increase from 2014 to 2015.

Demand for data may be growing among campus members, but more data does not necessarily mean more information or better decisions.

Data may actually crowd out peoples' ability to make decisions. Campus members do not require more data but they need to consume the data in different ways, with more accessible analytical resources and more proactive education about how to use data in decision making.

### The Pressure Is On

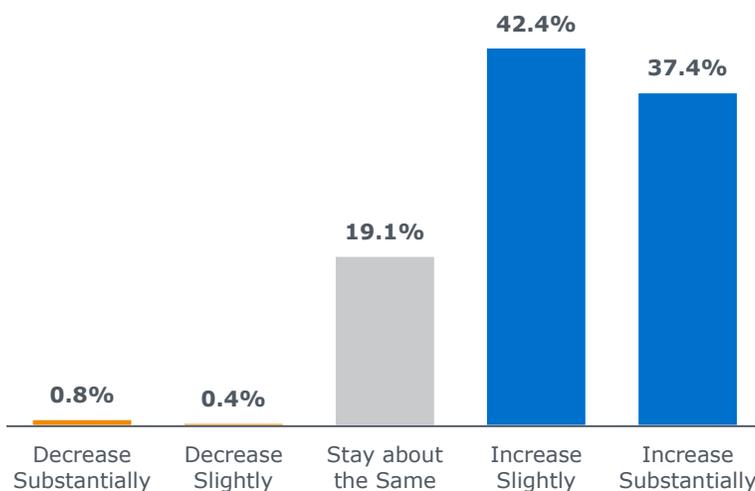
"Attention on analytics is everywhere; it's pervasive. The CIO's role is not perfectly clear, but it is clear that analytics is a critical issue for many senior leaders at the institution."

*Dana Roode  
Chief Information Officer  
University of California, Irvine*

### Demand for Decision Support Expected to Grow

*Deans and Department Chairs' Anticipation for Change in Usage of Analytics in 2015*

n=262



### A Lesson from Attention Economics

"A wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it."

*Herbert A. Simon  
Economist*

Source: Lisa Helmin Foss, "Implementing Data Analytics as an Organizational Innovation in Colleges and Universities," University of Minnesota Digital Conservancy (2014); EAB interviews and analysis.

# BI Inundated with Basic Requests

## Reporting Requests Crowding out Predictive, Prescriptive Analyses

A common lament among directors of decision support is the amount of time staff consume to serve custom data requests from campus members, which reduces time available for predictive or prescriptive analytical work for the institution.

At some institutions, decision support teams (i.e., institutional research, business intelligence) may be at full capacity working on external reporting requirements and ad hoc data requests.

One IT leader noted that the fully-loaded cost of staff, time, and technical resources for each major report the campus decision support team creates is about \$10,000, and one research university found that its decision support staff spent 3,500 hours in a year responding to ad hoc requests.

The tactics on the following page relieve some of the burden of custom reporting by empowering end users to self-serve for many of their data needs.



### Struggling to Be Strategic

"We continue to need to be reactive, to jump in and help to fix problems, which really is sucking away bandwidth to focus on strategic areas and otherwise contribute our expertise to campus."

*Anja Canfield-Budde  
Director of Enterprise Data and Analytics  
University of Washington*

### BI Focus Off Balance

Forced focus on reacting to campus requests...



...crowding out strategic BI endeavors



### Significant Money and Time Expenditures

**\$10,000**

per ad hoc report request (fully loaded cost)

**3,500**

hours spent on ad hoc reporting over 12 months at one research university

**3-6**

week backlog for typical unit-level requests

# Tactics

## Enhancing the User-Friendliness of Self-Service Resources

### Challenge



Decision support staff spend an inordinate amount of time retrieving basic facts and figures for campus members



### Tactic

Tactic 1:  
Institutional Factbook Configurator  
*pages 30-35*

Push out basic facts and metrics in a user-friendly format so that repetitive ad hoc requests don't take over staff time



Data consumers struggle with understanding data and to communicate lessons from data to others



Tactic 2:  
Pop-Up Data Presentation Prompts  
*pages 36-37*

Guide users to reports that may be of interest to them based on users' roles and activities to reduce the number of report requests from campus members



Campus members struggle to identify the relevant analytical resources for their decision support needs



Tactic 3:  
Role-Based Recommendation Engine  
*pages 38-41*

Provide embedded guidance to campus members on how to understand the data within reports



Once campus members identify analytical resources that may be of interest, they struggle to identify questions to ask of the data



Tactic 4:  
Crowdsourced Report Use Guides  
*pages 42-43*

Obtain user suggestions on how they use the data within reports to help other campus members identify how reports may be useful to them

# Lack of Reliable Data, Lack of Data-Informed Decisions

## Suffering from “Analysis Paralysis” in Highly Analytical Environments

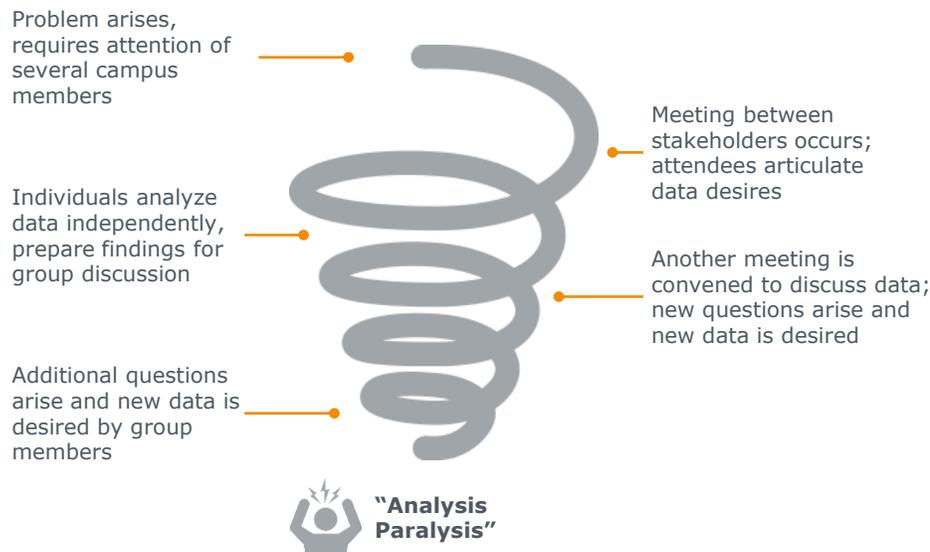
During the decision making process, members at highly analytical organizations, such as higher education institutions, may fall into an “analytical swirl,” either because of insatiable data desire or data denial.

For example, a math department may be struggling with the poor graduation rates of its students. Campus members convene and request student success data related to math majors. As decision support teams provide data to the group, the members may identify new questions to ask of data, require new datasets, or question the trustworthiness of the data. This may occur repeatedly, leading to analysis paralysis and no data-informed decisions being made.

The practices on the following page help decision support teams intervene before analysis paralysis can occur by better communicating the validity of data and key metrics for departmental or cross-campus analyses.

### Decision Making Process Iterative by Nature

*Each Discovery or Point of Skepticism Leads to an Additional Area of Inquiry*



Source: Mark Gottfredson and Michael C. Mankins, “Four paths to a focused organization,” Bain & Company, [http://www.bain.com/Images/BAIN\\_BRIEF\\_Four\\_paths\\_to\\_a\\_focus\\_ed\\_organization.pdf](http://www.bain.com/Images/BAIN_BRIEF_Four_paths_to_a_focus_ed_organization.pdf) (2013); EAB interviews and analysis.

# Tactics

## Promoting Single Versions of the Truth

### Challenge



Inconsistent data quality has trained campus members to be skeptical of data resources



### Tactic

Tactic 5:

Data Quality Assurance Certification

*pages 49-50*

Provide a visual indication of the potential underlying data quality to better inform decision makers about the appropriate level of caution (or lack of need for caution) when viewing the data



Decision support teams across campus create a plethora of reports, many of which disagree or fail to meet institutional standards



Tactic 6:

Demand-Driven Report Maintenance

*pages 51-55*

Assess existing reports and incoming ad hoc requests, eliminate or consolidate those that may provide conflicting data to campus members, and proactively create scalable reports based on frequently asked questions



Campus leaders lack standardized metrics to compare academic programs across campus



Tactic 7:

Standardized Program Evaluation Metrics

*pages 56-60*

Collaborate with institution leaders on the appropriate metrics to be standardized for routine comparisons and decision making, obtain their mandate to collect metrics from distributed units



Top-down efforts for metric standardization often create perverse incentives against mission-related goals



Tactic 8:

Semi-customizable Department Scorecards

*pages 61-62*

Develop a set of standard metrics that all like units must report, with built-in flexibility to allow for mission differences, enabling cross-unit comparisons but avoiding perverse incentives that discourage units from progress on other goals

# Distributed Skill Sets Not Passing Muster

## What Previously Passed for Unit-Level Analysis No Longer Does

While desire for data has increased, the skill sets of many staff in decision support roles are suboptimal for decision makers' needs and institutions struggle to hire and retain distributed staff with the appropriate skills for data analysis and decision support.

Many staff in distributed decision support roles maintain programming skills (e.g., COBOL), and many technical staff have been placed in these roles because of their ability to obtain data from campus systems.

Decision makers rely on these staff for data analysis and decision support as decision makers often lack experience or confidence in data and analytics. While these distributed staff maintain proficiency with data retrieval and data manipulation, they often struggle to

help support decision making through data analysis and communication with data.

With these skills in high demand across industries, campuses must identify ways to increase the abilities of distributed data staff while also better leveraging the skills of central decision support staff.

The practices on the following page help central decision support staff develop and connect distributed analysts to benefit from central efficiencies and subject matter expertise for decision support.

### Distributed Data Skill Sets Outdated...

*Illustrative*

Skill	Current: Programmer	Desired: Analyst
Data Retrieval and Manipulation		
Project Management		
Data Analysis		
Communication		



### ...And No Longer Sufficient

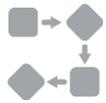
“The fundamental difficulty of self-service decision support at the unit level is the lack of both data expertise and bandwidth. The ability to effectively ask questions of data to produce the type of decision support needed are still emerging skills. As an institution, we need to make significant investments to grow the data culture.”

*Anja Canfield-Budde  
Director of Enterprise Data and Analytics  
University of Washington*

# Tactics

## Upskilling Distributed Analytics Staff

### Challenge



Institutions struggle to hire and retain analytics staff with proper skills for decision support



### Tactic

Tactic 9:  
Analytical Competencies Road Map  
*pages 69-71*

Help distributed units avoid hiring the wrong skill sets for analytics positions by inserting IT into the position description review



Institutions struggle to balance the efficiencies of central decision support teams as well as the effectiveness of distributed subject matter experts



Tactic 10:  
Matrix BI Reporting Lines  
*pages 72-74*

Embed analysts into distributed units and create dotted reporting lines back into IT to receive the benefits of subject matter expertise and enterprise data expertise



Distributed data-related staff maintain programming skills rather than decision support skills



Tactic 11:  
Business Analyst Cross-Training  
*pages 75-77*

Provide analyst-level training to distributed analytics staff to provide them with the skills needed to best support functional leaders and decision makers



Analytical efforts across campus occur in siloed environments, with campus members unaware of related efforts outside their own functions



Tactic 12:  
Data-into-Action Awards  
*pages 78-80*

Establish a venue and incentives for campus members to share stories of how analytics tools have helped their units to inspire new use ideas in other staff



Most analytics professional development occurs on a one-to-one basis, failing to benefit from economies of scale and distributed expertise



Tactic 13:  
Just-in-Time Expert Network  
*pages 81-84*

Create an online network of campus analytics staff to post and respond to problems and insights to benefit from a wider pool of experience and reduce BI staff time spent on responding to basic questions





# Enhancing the User-Friendliness of Self-Service Resources

*Problem: Campus members struggle to obtain value from existing analytical resources and inundate Decision Support teams with basic data requests, reducing time available for strategic analysis*

---

PART

1

- Tactic 1: Institutional Factbook Configurator
- Tactic 2: Pop-Up Data Presentation Prompts
- Tactic 3: Role-Based Recommendation Engine
- Tactic 4: Crowdsourced Report Use Guides

# Decision Support Frustrating from a User's View

## Every Hurdle Not Cleared = A New Ad Hoc Request for Your Team

Central decision support team are often inundated with ad hoc data requests, in part due to skill deficits, data presentation issues, and uncertainty of how to use decision support resources across campus.

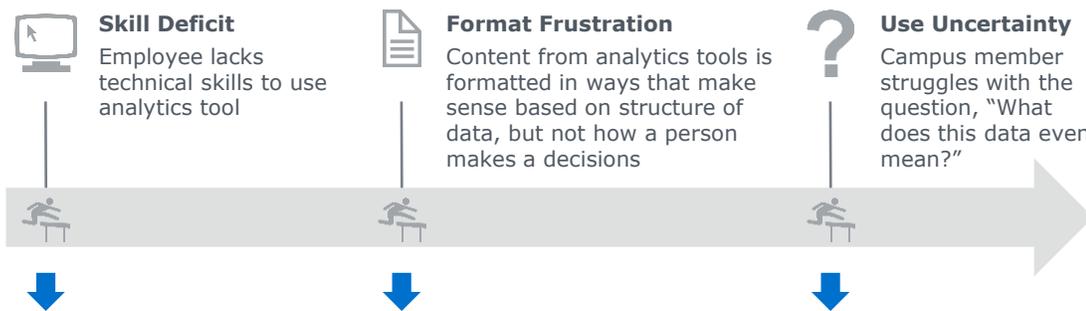
With increased emphasis on user experience by vendors, the technical barrier to analytics tool use has never been lower. Nevertheless, skill deficits remain significant for many users. If a campus member cannot determine how to access or analyze the data, central decision support will need to address user requests on an ad hoc basis.

Frustrations with formatting arise because decision support teams often create resources based on data structures, not based on user needs. If a user cannot identify how to get to the data they need, an additional request will be added to the decision support queue.

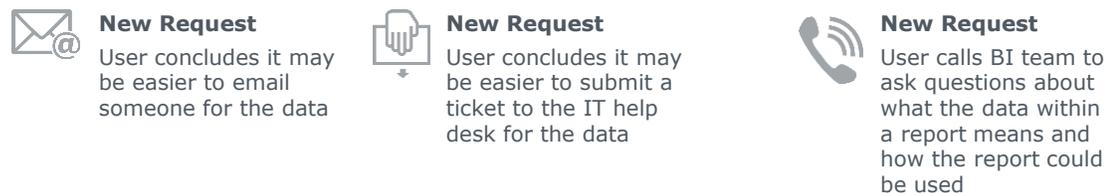
Further, campus members who attend training sessions on analytics tools often leave without understanding how to apply the tools. These users may be able to access the data but they still require further assistance to convert the data into action.

These hurdles to self-service, while challenging, present opportunities for decision support teams to improve user experience.

### Many Hurdles in the Way of Self-Service...



### ...All of Which Lead to More Individual Requests



# Usability of Analytics Tools Gets an F

## Self-Service Impossible Without User-Friendly Tools

Data from a 2014 dissertation by Lisa Helmin Foss, the Associate Vice President and Associate Provost in the Office of Strategy, Planning & Effectiveness at St. Cloud State University, presents insights into deans' and department chairs' perceptions of analytics tool usability. Unfortunately, these campus members are generally dissatisfied with the analytics tools on their campuses.

Only one-quarter to one-third of surveyed deans and department chairs agreed or strongly agreed that their institutions analytics tools provide data in the right format, make information easy to access, do what users want them to do, are versatile in addressing

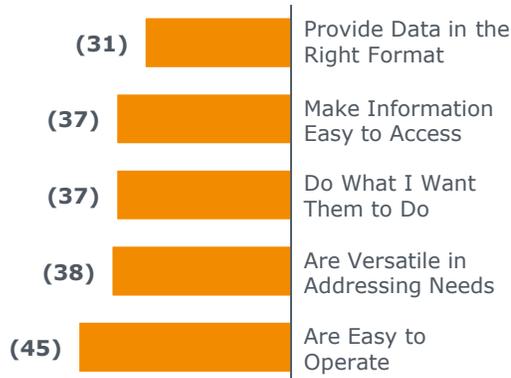
needs, or are easy to operate. Of the over 200 survey respondents, none strongly agreed with the statement that their institutions' analytics tools are easy to operate.

Without simplifying ease of operation, decision support teams cannot achieve analytics self-service for their campuses.

### Analytics Tool Experience Unsatisfying<sup>1</sup>

Percentage Point Gap of Positive Responses<sup>2</sup> Minus Negative Responses<sup>3</sup> for Deans' and Department Chairs' Observations of Data Analytics Tools, 2014

n=215



### Analytics a Chore

“Overall, academic leaders do not find the data analytics tools available to them to be particularly usable... In fact, not a single respondent strongly agreed that their institution's data analytics tools were easy to operate.”

*Lisa Helmin Foss  
AVP and Associate Provost  
Strategy, Planning, and Effectiveness  
Saint Cloud State University*

1) "Don't Know" was excluded from this analysis.  
2) "Agree" or "Strongly Agree"  
3) "Disagree" or "Strongly Disagree"

Source: Lisa Helmin Foss, "Implementing Data Analytics as an Organizational Innovation in Colleges and Universities," University of Minnesota Digital Conservancy (2014); EAB interviews and analysis.

# Tactic 1: Institutional Factbook Configurator

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## Tactic in Brief

Typical factbooks present key institutional metrics in static tables, which users find hard to navigate and challenging to use for data analysis. An institutional factbook configurator provides a user-friendly and easy-to-navigate way to access and visualize the most basic institutional data. Filters enable campus members to organize data according to their needs rather than what decision support teams believe to be useful, but which is often not.

## Problems Addressed

Central decision support teams dedicate an inordinate amount of time responding to ad hoc requests for simple facts and data, which limits time available for strategic data modeling and predictive analytics. Further, campus members struggle to translate data from static data reports into actionable knowledge.

## Implementation Guidance



Cornell University

- Institution type: Four-year, private
- Enrollment: 21,700 (14,300 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Small city (Ithaca, New York)

# Heavy Binders Not Cutting It

## Digitalization—and Visualization—of Decision Support

Usability often depends upon how data is presented. If data is not presented in an easily digestible format, campus members will struggle to use them in decision making.

Cornell University historically distributed thick binders with printed tables that provided what Institutional Research identified as the most important metrics for campus—the institutional factbook. When IR moved the factbook online in 1997, they scanned these paper-based tables into an online registry as PDFs, increasing accessibility but not ease of use.

Data consumers on campus struggled to navigate these hierarchical tables. This led to the perception that the university lacked data and that cross-institutional analyses were impossible. To combat these

perceptions, in 2012 Cornell University’s IR department decided to transition their institutional factbook from electronic PDFs into an online, configurable factbook using Tableau. One staff member completed the transition in less than one year, with much of the time dedicated to standardizing data elements for longitudinal comparisons.

This shift has enabled campus members to access and query basic institutional metrics without assistance from central decision support.

### Tables of Data Hard to Quickly Understand

*Previous Factbook Efforts at Cornell Ineffective*



Cornell University



189

paper tables collected in a three-inch binder

189

electronic tables put into an online repository

6

interactive online factbooks



- Mountains of data



- Mountains of data
- Easy to access



- Mountains of data
- Easy to access
- Customizable for individual needs
- Easy to interpret data visualizations



- Data presented in hard-to-understand tables
- Challenging to do cross-table analysis
- Lacks most combinations people might want to analyze

# Self-Service for Basic Facts

## Simple Filters Address the Usual Suspects of Data Requests

Before the transition from static factbooks to a factbook configurator, users could browse the data tables to obtain metrics, but this process was time-consuming and users were limited to the data combinations pre-created by IR.

In Cornell’s Student Enrollment workbook, shown above, IR provides users with data filters based on the most common ad hoc requests that IR has historically received, as shown below.

At many institutions, the average backlog for data requests is weeks for even the simplest of data requests. At Cornell, campus members can now get immediate answers to their basic questions without querying decision support staff and waiting for a response.

**Cornell University Enrollment Details**

All data are as of the end of the sixth week of fall semester classes. In absentia registrants are not included. Weill Cornell Medical College students are not included. Post 2009, students who are in the Internal Transfer Division are counted in the incoming college.

Select student career: Undergrad | Select column one: College | Select column two: Class

Limit to:  (All),  First time freshmen,  New transfers (undergrad),  Continuing,  Special, non-degree

Select term(s):  Fall 2002,  Fall 2003,  Fall 2004,  Fall 2005,  Fall 2006,  Fall 2007,  Fall 2008,  Fall 2009,  Fall 2010,  Fall 2011,  Fall 2012,  Fall 2013,  Fall 2014,  Fall 2015

All students: Fall 2012, Fall 2013, Fall 2014 and 1 more

Career	Column one	Column two	Fall 2012	Fall 2013	Fall 2014	Fall 2015
Undergrad	Agriculture and Life Sciences	Freshmen	673	666	680	662
		Junior	1,043	1,026	933	928
		Senior	972	1,108	1,084	995
		Sophomore	851	796	855	880
Architecture, Art and Planning	Freshmen	Junior	114	130	123	113
		Senior	108	112	100	110
		Senior	168	166	161	169
		Sophomore	109	106	112	109
Arts and Sciences	Freshmen	Junior	1,079	1,111	1,096	1,094
		Senior	1,031	1,028	1,012	977
		Senior	1,068	996	1,025	984
		Sophomore	1,099	1,058	1,061	1,055
Engineering	Freshmen	Junior	786	770	769	748
		Senior	638	698	732	722
		Senior	707	752	813	849
		Sophomore	758	785	764	769
Hotel Administration	Freshmen	Junior	194	179	187	187
		Senior	248	238	261	253
		Senior	250	264	247	268
		Sophomore	240	252	236	242
Human Ecology	Freshmen	Junior	293	288	294	277
		Senior	302	286	326	321
		Senior	341	317	291	334
		Sophomore	284	298	307	288
Industrial and Labor Relations	Freshmen	Junior	164	169	163	166
		Senior	239	276	281	265
		Senior	253	250	297	303
		Sophomore	249	268	243	247
<b>Total</b>			<b>14,261</b>	<b>14,393</b>	<b>14,453</b>	<b>14,315</b>
<b>Grand Total</b>			<b>14,261</b>	<b>14,393</b>	<b>14,453</b>	<b>14,315</b>



**Simple Filters Based on Common Requests to IR**

Enrollment workbook column options include:

- College
- Sex
- Minority
- Race/Ethnicity
- Degree Objective
- Class
- Sector (Endowed/Contract)
- On/Off Campus
- Home State at Matriculation

Source: Cornell University Factbook; EAB interviews and analysis.

# Preparing for Unanticipated Questions

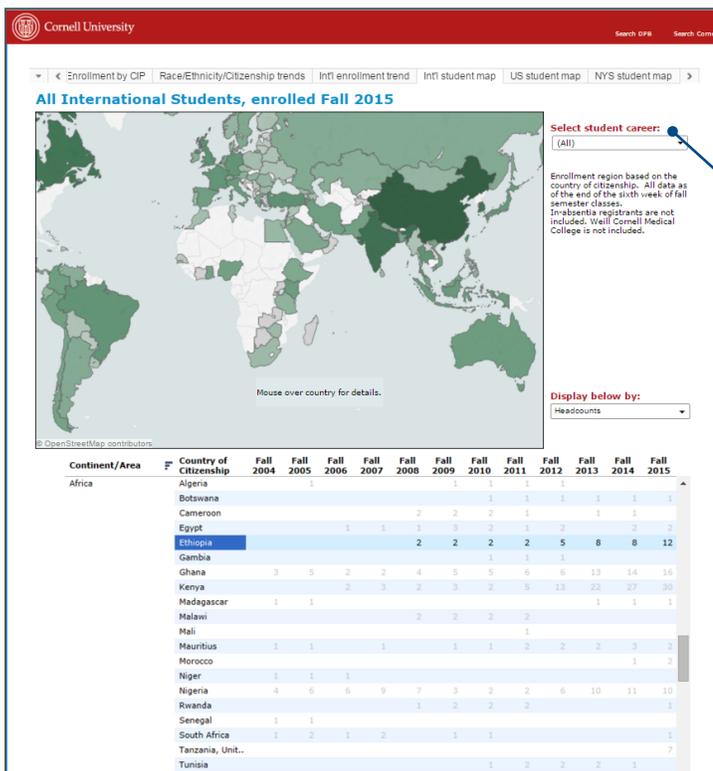
## High Flexibility in Configuration Enables Campus Self-Service

The institutional factbook configurator’s high degree of flexibility drastically increases its usefulness to campus members compared to the previous static factbook.

The flexibility enables users to answer questions unanticipated by IR. For example, if a donor desires to know how many undergraduate students were enrolled at Cornell over the last decade from a specific country, an advancement officer requires only a few clicks within the factbook configurator to answer that question (as seen in the below screenshot).

The visualization of data also makes immediate impressions on users. With only a quick glance at the Student Enrollment workbook, users can quickly assess which countries are sending more students to Cornell than others.

All departments across campus, from student affairs to public relations, benefit from this flexibility. The factbook configurator enables campus members to find simple facts themselves, which frees up decision support staff time.



Cornell University

**Drill-Down Functions Provide Access to Answers for Yet-to-Be Asked Questions**

Advancement Officer:  
*"How many undergraduate students have we had over the last decade from Ethiopia?"*

Student Affairs VP:  
*"How does study abroad participation differ based on student race?"*

Public Relations Staff:  
*"What percent of graduate students come from Albany county?"*

Source: Cornell University Factbook; EAB interviews and analysis.

# From Having Data to Using Data

## Enhancing Usability Makes Getting to Knowledge Faster

Providing more intuitive access to basic data has enabled the decision support team at Cornell University to provide answers faster and serve more campus members. This has freed staff time to provide more assistance to campus members about how to use data for decision making.

The IR department went from creating many variations of the same report for each department to providing one primary data visualization portal with self-service filters.

Users no longer have to wait a few days to get answers to basic questions, as they can find answers to many of these questions in a few clicks by using the factbook configurator.

Previously, the basic data not included in the static factbook was only accessible by IR staff. Now, even Cornell’s president and provost use the factbook to quickly pull figures for speeches or presentations.

The factbook configurator does not eliminate queries to the decision support team, but it decreases the number of basic data requests the team receives. Contacts at Cornell report that IR has more time to answer questions better suited to the staff’s expertise—not fact finding, but data analysis.

### Slow, Costly Delivery of Basic Facts



#### *Wasted IR Staff Time*

Create 90 variations of a report for each department



#### *Slow User Experience*

User emails IR, waits a few days to get an answer



#### *Limited User Base*

Most IR data only accessible by IR staff



### Better Quality at Lower Cost

#### *Ease of Self-Service*

Create one easy-to-use data visualization platform with filters

#### *Immediate Answers*

Fewer than five clicks to answer most questions

#### *Widespread Access*

Even the president and provost are using it

### Silence Is Success

“We judge success of the factbook when people stop contacting us with questions the factbook can answer. If my phone is not ringing, that’s great.”

*Marin Clarkberg  
Director of Institutional Research and Planning  
Cornell University*



# Implementation Tip: Increasing Adoption

## Accelerating Usage of the Factbook Configurator Across Campus

Decision support at Cornell University actively pushes the factbook configurator to campus members as the go-to resource for data requests.

When decision support staff receive questions the factbook can answer, staff respond with instructions for how the campus member can self-serve in the future. For example, rather than just respond to a request that the percent of faculty at Cornell in the College of Engineering is 4.8%, the decision support staff member will send a screenshot of the workbook page where that data can be found, along with instructions for navigating the workbook, as shown below.

### IR Responses to Data Requests Teach Users to Fish for Themselves

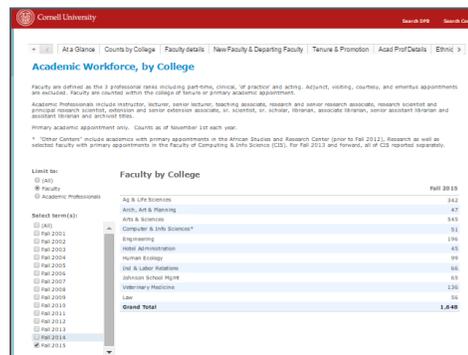


"What percent of faculty at Cornell are in the College of Engineering?"

"Have you checked the Factbook? You can find the answer in the 'Academic Employees' workbook under the 'Counts by College' view. Here's how to get to the data..."



Cornell University



1. Access the Factbook through the IR website
2. In the "Academic Employees" workbook, go to the "Counts by College" view
3. Select "Faculty" and "Fall 2015" (the definition of faculty is above the table)
4. Use the counts to obtain the percent of faculty in the College of Engineering

# Tactic 2: Pop-Up Data Presentation Prompts

---

## Tactic in Brief

Decision support staff upload narrative text into reports to provide accessible descriptions of the data. Users may hover over visualized data elements to access the descriptive text.

## Problems Addressed

Campus members lack data literacy skills to interpret data.

## Implementation Guidance



Cornell University

- Institution type: Four-year, private
- Enrollment: 21,700 (14,300 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Small city (Ithaca, New York)

# Promoting Data Literacy

## Translating Visualizations into Descriptive Text to Avoid Misinterpretations

While users may be able to locate the correct data source for their needs, they may not understand the implications of the data. Central decision support can provide in-report guidance to help campus members comprehend the data.

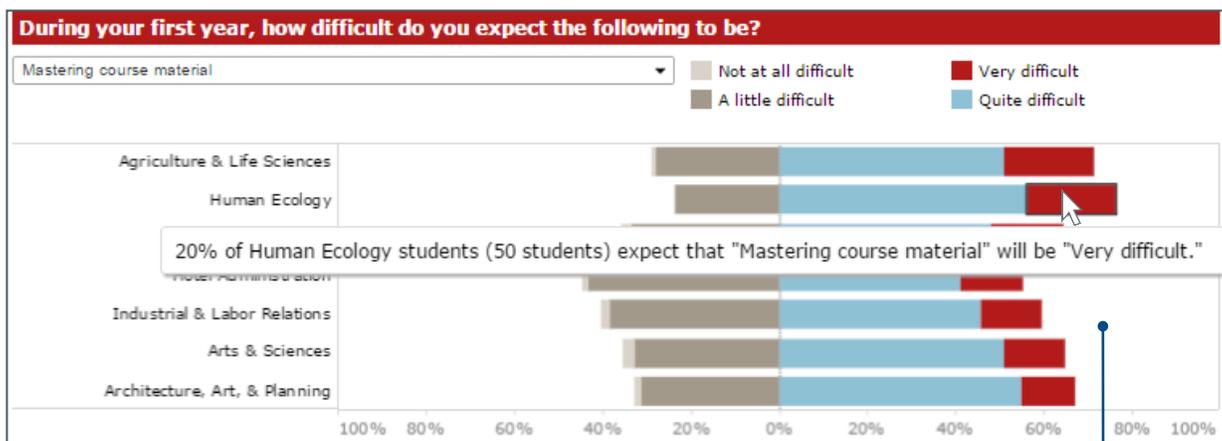
comprehensible text. Users who hover over the data in the visualizations can quickly and easily understand the implications of the data.

Users often misinterpret data. These misunderstandings not only misdirect individual decisions but also lead to mistrust in institutional data.

The institutional factbook configurator at Cornell University, profiled in Tactic 1 (pages 30-35), incorporates pop-up data presentation prompts to help promote data literacy. Within the institutional factbook configurator data visualizations, IR staff edit the default text provided by Tableau’s Tooltips to provide more



Cornell University



**✓ One Right Way**  
20% of Human Ecology students expect that “mastering course material” will be “very difficult”

**✗ Easy to Get It Wrong**  
20% of students who expect that “mastering course material” will be “very difficult” are Human Ecology students

**Easy Fix**  
IR staff edit the default text provided in Tableau’s Tooltips to read more naturally

Source: Cornell University Factbook; EAB interviews and analysis.

# Tactic 3: Role-Based Recommendation Engine

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## Tactic in Brief

Business intelligence users are guided to reports they may find helpful for their particular role and information needs. A feature within the BI portal recommends reports to end users in two ways:

1. Based on similar data elements in reports those users have viewed; and
2. Reports that campus members in similar roles have viewed.

## Problems Addressed

Decision support teams create a plethora of reports for different users, overwhelming campus members with options. End users typically view a narrow range of reports and are unsure of what other reports may be applicable to their work.

## Implementation Guidance



- Institution type: Four-year, public
- Enrollment: 44,800 (30,700 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Large city (Seattle, Washington)

# Matching User Needs to Existing Reports

## Improving Navigation of Analytical Resources

Shifting to a self-service environment requires users to find the data resources most associated with their needs. IT leaders can help users by providing easy navigation tools: simple filters, search mechanisms, and report recommendations.

Often decision support teams build up vast repositories of data resources to help campus members, and most institutions rely on end users to determine for themselves which reports are relevant to their work; however, users often struggle to identify analytical resources to meet their data needs. The University of Washington’s BI portal helps match user needs to existing analytical resources.

First, the portal provides simple filters to let users sort reports by subject area, the department that created the report, the database from which the data is pulled, or the table from which the data is pulled.

Second, the portal tailors report recommendations to users, similar to online shopping experiences and service provider reviews.

These recommendations—based on user-report activity logs and report-report activity linkages—help combat the disconnect that can occur when BI report writers believe they have created resources that will answer users’ questions but end users remain confused about how to get value from BI resources.

### Simple Filters Bring Users to What They Need



#### Subject Area

- Academics
- HR
- Financial



#### Table

- Account Code
- Actual Distribution
- Award Status



#### Support Group

- Management Accounting
- Office of Research Information Services
- Payroll Office



#### Database

- General Ledger Data Mart
- Operational Data Store
- HRIS

### Personalized Recommendations Guide Users to New Data Sources

*Finding a Use for Report Activity Logs*

#### User-Report Linkages



#### Report-Report Linkages



#### Nothing Too Sophisticated Needed to Tailor Recommendations

- User and User’s Campus Role
- First Report Name and Date Generated
- Second Report Name and Data Generated



# Just the Data You Were Looking For

## Reports Recommended Based on the User's Role

The University of Washington directs users to useful reports by recommending them based on their report generation histories. These recommendations are tailored to individual users based on reports that others in similar roles across campus have viewed.

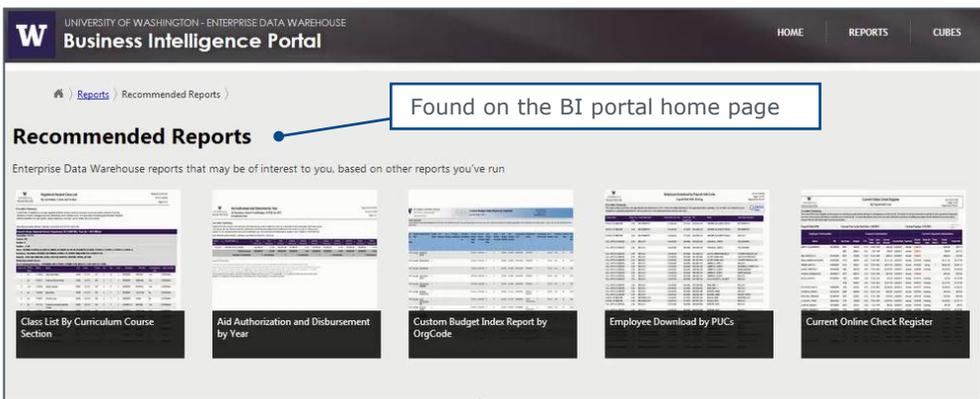
This function surfaces potentially useful reports that users may have forgotten or never known about. The algorithm behind the recommendation function draws from reports that the user has viewed according to report activity logs. The algorithm compares this to the reports viewed by campus members in similar roles in order to generate recommendations for additional reports. To obtain access to the BI portal, a user obtains privileges from one of 14 standard roles

created by the university's data management committee.

For example, this process enables a payroll coordinator within the College of Arts and Sciences to receive suggestions informed by the reports that have been viewed by other payroll coordinators across campus.

The algorithms used by the University of Washington to recommend reports can be found in the Implementation Resources section on pages 92-93.

Algorithm identifies and recommends reports that the user has never run (or hasn't run recently) based on other reports the user frequently views as well as reports that other campus members in a similar role frequently view



### Example reports recommended to user:

- Class List by Curriculum Course Section
- Aid Authorization and Disbursement by Year
- Custom Budget Index Report by Org Code

Source: "A Common Currency," EAB (2015); University of Washington, Business Intelligence Portal Guided Tour; EAB interviews and analysis.

## Users Who Viewed This Report Also Viewed...

### Taking Customer Service Inspiration from Major Online Retailers

The second way the University of Washington's BI portal guides users to relevant reports is providing recommendations within descriptions of individual reports. The algorithm for this function identifies the additional reports viewed in close time proximity with the present report.

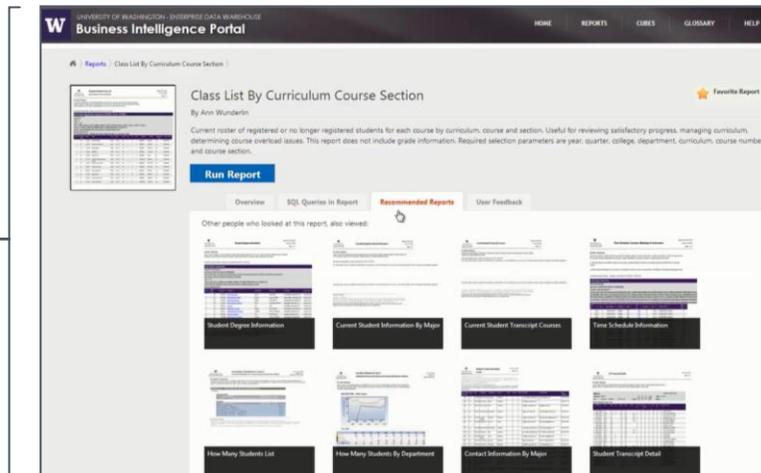
Washington's recommendation functionalities have helped increase visibility across campus for the different central reports within the BI portal. Adoption has also increased as users have become more familiar with the available reports.

The University of Washington also assesses how many hours BI staff dedicate to operational tasks compared to strategic initiatives (e.g., ad hoc reporting versus data modeling). Over the last few years, the team has

devoted between eight and 15% of their time to operational tasks, an amount significantly lower than most universities. The team's emphasis on user-friendly interfaces and self-service navigation has helped limit ad hoc requests.

#### Other people who viewed the "Class List By Curriculum Course Section" report also viewed these reports:

- Student Degree Information
- Current Student Information by Major
- Current Student Transcript Courses
- Time Schedule Information
- How Many Students List
- How Many Students by Department
- Contact Information by Major



Source: "A Common Currency," EAB (2015); University of Washington, Business Intelligence Portal Guided Tour; EAB interviews and analysis.

# Tactic 4: Crowdsourced Report Use Guides

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## Tactic in Brief

Within a report portal, campus members provide comments on how they use individual reports. Comments inform other campus members on how to use reports for their own decision making.

## Problems Addressed

Users struggle to formulate questions to ask of data to identify insights.

## Implementation Guidance



- Institution type: Four-year, public
- Enrollment: 44,800 (30,700 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Large city (Seattle, Washington)

# Surfacing Use Cases for Analytical Resources

## Answering the Question: “What Can I Even Do with This?”

Even users who are viewing the correct reports for their needs can struggle to identify how to use them well. The University of Washington thus pairs the recommended reports features, profiled in Tactic 3 (pages 38-41), with user feedback to create a virtual BI user group.

Within each individual report, users can post comments about how they use the report, identifying usage opportunities for others.

This feature also provides a boon to BI teams, who utilize the crowdsourced information to inform future report development.

### Example User Feedback for the Report “Class List By Curriculum Course Section”



*IT Help Desk Technician,  
School of Business*

#### How I Use It:

I work with Blackboard and Canvas and need to be able to look up enrollments in a class. When students have trouble accessing a Blackboard or Canvas course, I use this report to verify that they do indeed have the correct course.



*Undergraduate Advisor,  
Environmental and  
Forest Studies*

#### How I Use It:

Which students need to be notified if we are dropping, moving, or changing a class? What are the email addresses for all students enrolled in a specific course?



*Program Assistant,  
Electrical Engineering*

#### How I Use It:

Which students are enrolled in particular courses? Which students are enrolled in research credits? How many non-majors are enrolled in departmental courses? What is the class standing distribution of students in a particular course?



# Move from a Pull to Push Environment

## Connecting Consumers to Data, Not Central Decision Support Staff

A lack of usability creates a “pull” environment in which campus members go directly to the decision support team for ad hoc requests. Undisciplined pull climates overburden the decision support team and crowd out its ability to conduct strategic work, such as building out data models or creating predictive analyses.

Progressive institutions have begun transitioning to a “push” environment. In a push environment, users primarily interact with data resources curated by the decision support team for campus members. Decision support staff focus efforts on scalable analytical resources to serve campus needs rather than individual needs. The decrease in ad hoc requests enables decision support teams to focus more of their time and energy on developing a better data repository for self-service.

### Focus on Responding to Campus Member Queries

*Undisciplined “Pull” Climate*



- 1 Ad Hoc Query**  
Campus member requests data from central decision support unit
- 2 Ad Hoc Response**  
Decision support responds to campus member’s one-off request in one-off format

### Focus on Building Out Scalable Resources for Self-Service

*Scalable “Push” Environment*



- 1 Improved Repository**  
Decision support creates a repository of analytical resources; pushes resources to campus members
- 2 Self-Service**  
Campus members pull basic data themselves, reach out to decision support for only complex needs



# Promoting Single Versions of the Truth

*Problem: Highly analytical environments, such as higher education, foster skepticism of data; disagreement about data validity leads to reliance on intuition over data for decision making*

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PART

2

- Tactic 5: Data Quality Assurance Certification
- Tactic 6: Demand-Driven Report Maintenance
- Tactic 7: Standardized Program Evaluation Metrics
- Tactic 8: Semi-customizable Department Scorecards

## Searching for a Needle in a Haystack

### Rationalization, Not Investigation, at the Heart of Many Analytical Efforts

Undisciplined requests consume a significant amount of decision support teams' capacity, and some of these requests occur because of campus members' desire to rationalize their assumptions. A significant difference exists between data investigation and rationalization—the former seeks to learn something new, while the latter tries only to prove an already held belief.

A dean at one member institution was convinced that his college's living-learning program increases student retention and graduation rates. To prove the effect, he asked the institution's business intelligence team to provide data supporting his hypothesis.

The BI team discovered that the living-learning program does possess high retention and graduation rates. However, they also identified that these programs generally attract highly capable students.

These students typically retain and graduate at higher rates, so the finding did not support the dean's hypothesis that the program improves retention and graduation.

Unfortunately, the dean remained unconvinced that his hypothesis is wrong and asked the BI team to review the data again. Digging further, the BI team ascertains that living-learning program does help with retention in one regard—it helps keep the high-achieving students within the same college, as its participants switch colleges at a lower rate than other high achieving students.

This type of rationalization rarely leads to changes at the institution and often occurs at the expense of valuable decision support staff time.

### "Evaluating" the Impact of Living Learning Programs

#### Initial Knowledge

Dean convinced that college living learning program (LLP) increases student retention and graduation rates, asks BI team to investigate



#### Refutation

BI team finds that LLPs attract highly capable students in the first place, who are expected to be retained and graduate at higher rates; no independent benefit of LLP is found



#### More Analysis

Data team reviews data again, finds that LLPs help keep the high-achieving students within the same college



#### Firm Conviction

Dean unconvinced hypothesis is wrong: "But I need data to support my hypothesis! Look at the data again"

“As soon as faculty become administrators, scientific method goes right out the door.”

*Chief Information Officer  
Public Research University*

## “Lawyering Up” Counterproductive

### Distributed Data Specialists Used to Refute Central Data Sources

Another ineffective use of data for decision making is “lawyering up”—using data defensively to refute others’ data.

Often unit-level data specialists are tasked with refuting others’ data. When a decision is required on a topic such as faculty line reallocation, department leaders may aim to refute data from central offices with differing enrollment or workload numbers, perceived data quality problems, and other issues.



Source: EAB interviews and analysis.

# Skeptical Data Users Proceed with Caution

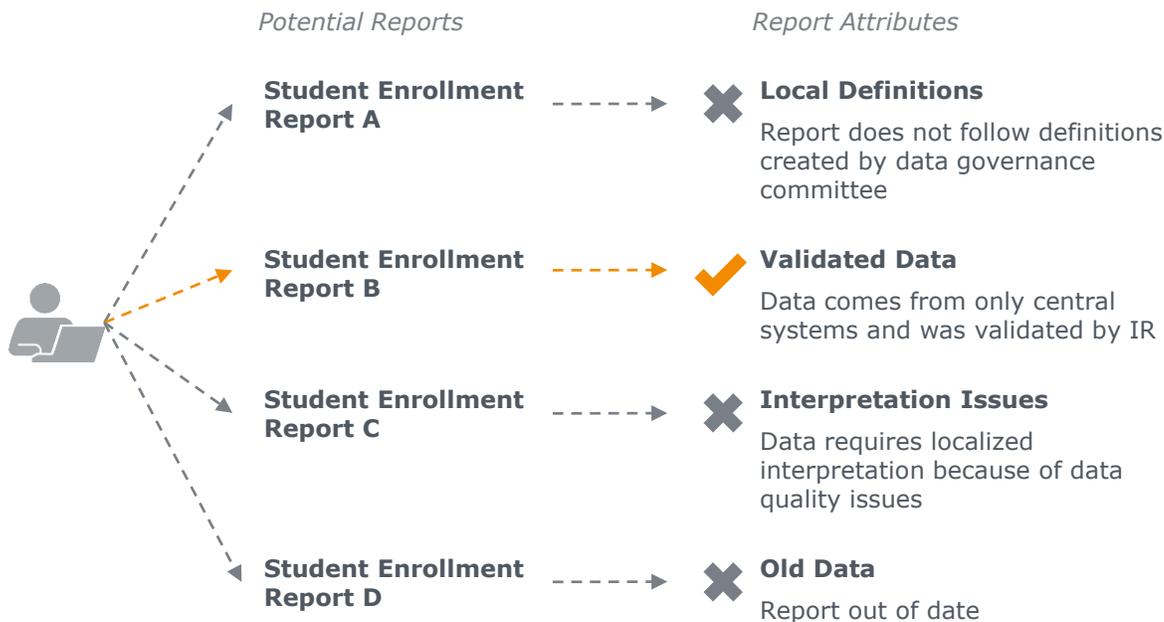
## Inconsistent Data Quality Trains Users to Be Skeptical of Data

Campus members often struggle to identify the right data sources because there are many potential report available. Further, the inconsistency of quality across reports has trained users to be skeptical of institutional data.

Without strong data governance practices, campus members create reports with inconsistent logic or definitions. Other reports possess data quality issues of which only the author and regular users are aware.

While data governance is important, it can be a lengthy process, so institutions have increased visibility of underlying data quality in reports, limited the number of report options available, and standardized performance metrics.

### Diversity of Data Sources Confusing, Frustrating to Users



Source: EAB interviews and analysis.

# Tactic 5: Data Quality Assurance Certification

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## Tactic in Brief

Badges indicating underlying data quality overlay reports in a BI portal. The badges provide an immediate assessment of the validity for use in decision making, pre-empting data quality questions or disputes.

## Problems Addressed

The frequency of data quality issues over time has trained campus members to be skeptical of institutional data. The skepticism, along with an unreasonable desire for “perfect” data, often stalls decisions when data good enough for decision making already exists.

## Implementation Guidance



**INDIANA UNIVERSITY**

- Institution type: Four-year, public
- Enrollment: 45,400 (36,400 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Small city (Bloomington, Indiana)

# Providing an Immediate Quality Assessment

## Badges in BI Portal Communicate Level of Report Validity

IT leaders at Indiana University envision a badging system within the institution's BI portal to help campus members quickly identify reports' underlying data quality. With this knowledge, users could identify which reports they should feel comfortable using without needing any additional assistance and which reports may have local abnormalities that would require additional assistance.

Platinum and gold reports, which use system-of-record data, are reliable without further review because the underlying data elements match institutional data governance standards and the institution's data dictionary.

Data in silver and bronze reports may be subject to more local norms, because those reports use some data from non-system-of-record sources, and thus might benefit from interpretation at the local level.



### Reliable Without Further Review

- Data elements match institutional data governance standards; definitions match data dictionary
- Data trustworthy for communications with senior leaders on campus for decision making



### May Require Further Digging

- Data reliability subject to local norms, may not match institutional data governance standards
- Data may require some interpretation from a user within the function who generated the report



INDIANA UNIVERSITY

*As data integration efforts proceed, utilization metrics can help identify sources that will be most useful to integrate*

# Tactic 6: Demand-Driven Report Maintenance

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## Tactic in Brief

Decision support teams consolidate analytical resources—reports and dashboards—to minimize conflicting sources of data for decision support. To consolidate resources, decision support teams review utilization metrics (e.g., frequency of use, number of unique users, roles of users) and data field commonalities across resources. Decision support teams either eliminate unnecessary reports and merge content with others or create a master dashboard to replace multiple older resources.

## Problems Addressed

Analytical resources proliferate over time due to campus member requests and modifications. These reports, which may be created with different logic or by different authors, provide conflicting data, impeding decision making. Further, an overabundance of analytical resources requires many man hours by IT staff and end users during any system upgrades.

## Implementation Guidance



- Institution type: Four-year, private
- Enrollment: 3,600 (3,500 undergraduates)
- Carnegie classification: Baccalaureate Colleges—Arts & Sciences
- Campus setting: Distant town (Lewisburg, Pennsylvania)



- Institution type: Four-year, public
- Enrollment: 47,900 (35,200 undergraduates)
- Carnegie classification: Master's colleges and universities (larger programs)
- Campus setting: Small city (Adelphi, Maryland)

## When Everyone's Looking for More...

### Bucknell's President Mandates Consolidation of Tools and Reports

In 2012, Bucknell University president John C. Bravman released his presidential charge for BI. Most of the charge represents common desires—growing a data-driven culture, creating a common data set, improving integration efforts, and establishing common definitions. But one element of the charge stood out: consolidating BI tools.

To meet this charge, Bucknell transitioned legacy analytics tools across the campus to Cognos. Additionally, IT staff are decreasing the number of analytical resources available to campus members through a report consolidation process, helping to limit the diversity of data sources available.

#### Presidential Charge Lays Out BI Road Map



BUCKNELL UNIVERSITY.

*John C. Bravman  
President*

Bucknell University will:

1. Improve our capacity to measure performance, find data trends and exceptions and grow a data-driven decision culture across all divisions
2. Form a common data store and shared access model that eliminates data silos and enables both strategic analytics and operational reporting
3. Enable point-in-time and historical data snapshots for analysis over time
4. Ensure comprehensive integration with Banner data, including adjusting legacy business processes to maximize the value from this system
5. Establish consistent use of data definitions, audit documentation, and data stewardship across multiple University dimensions
- 6. Consolidate intelligence tools to maximize our analytics competencies at all functional levels while minimizing the technical support footprint**
7. Create executive dashboards to assist with deliberations and decisions

Presidential call for consolidation of analytics tools inspires reduction of conflicting reports

# Doing More with Less

## Fewer Reports and Inconsistencies Leading to More Answers

Bucknell University has started to consolidate its analytics tools and reports to reduce discrepancies and limit the number of conflicting analytics resources.

Over time, various report writers had created over 700 student data-related reports. The majority of these reports lacked compliance with institutional standards, yet required significant time from end users and IT staff for testing after software updates.

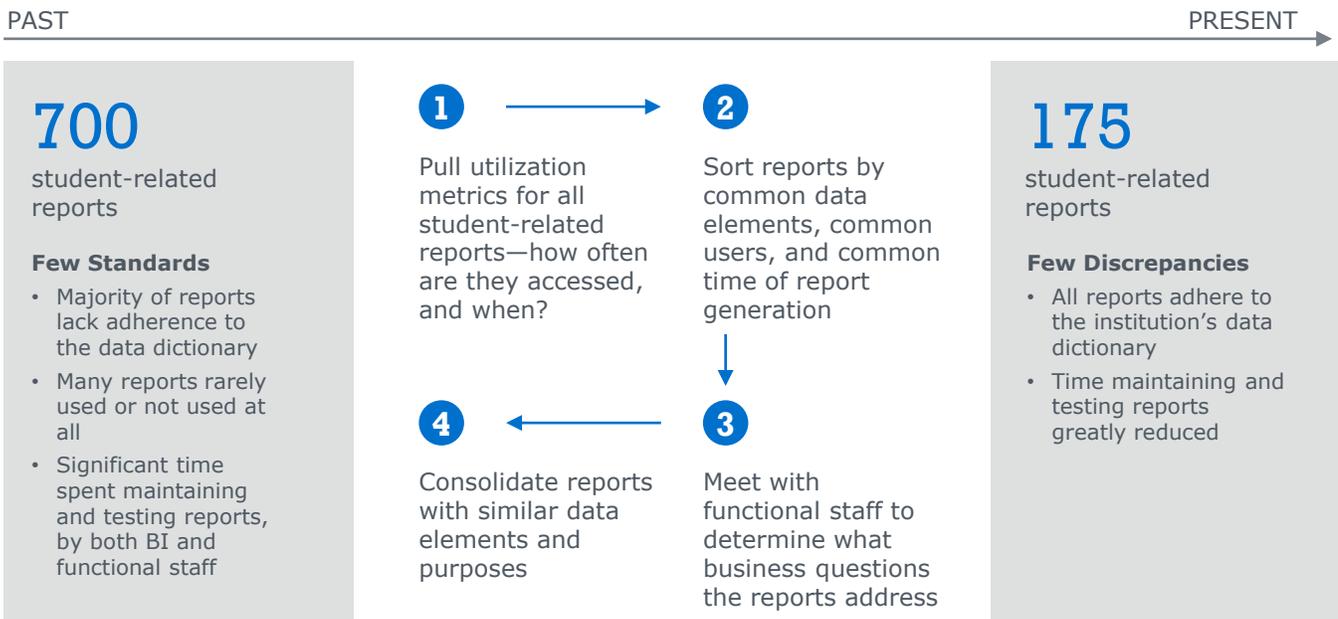
The overabundance of reports led to a mistrust of data and delayed data-informed decision making, so IT staff met with functional users to eliminate conflicting reports.

To solve this problem, IT staff first pulled utilization metrics to identify how often reports were accessed, who across campus accessed them, and when the

reports were accessed. The BI team sorted the reports by common data elements, users, and time of generation and met with functional users to determine how reports were used. This enabled them to consolidate reports with similar data elements and purposes.

Throughout this process, Bucknell eliminated over 500 reports, helping to lower decision fatigue and time spent on report maintenance.

### Consolidation Reduces Conflicting Reports



Source: EAB interviews and analysis.

# Getting Ahead of Ad Hoc Questions

## From Individual Responses to a Once-Size-Fits-Most Approach

The analytics team at the University of Maryland University College has done targeted consolidation of their academic program-related reports into a master dashboard.

In light of an increasing load of ad hoc requests, the analytics team reviewed all requests from the previous year to determine commonalities. The team discovered that academic program-related requests compose a plurality of all requests the team received. As a result, they created a master dashboard for academic leaders to review program performance based on all the ad hoc requests they were getting about academic programs.

### Perform Review of Requests



Mine all ad hoc requests related to academic programs from the previous year; review publicly accessible dashboards from other institutions for comparison



### Analyze Current Abilities



Assess which data was already included in university data models and which data would need to be pulled into the data warehouse



### Create Master Dashboard



Create a one-size-fits-most solution for academic leaders to review program performance (enrollment, student success, and faculty performance); stave off future ad hoc requests



### Simplicity and Actionability Key to Buy-In

- Focus on data modeling to combine disparate data sources into one resource
- Identify potentially useful derived variables to facilitate analysis (e.g., gap in attendance, not just attendance)
- Start simple and provide drill-down capabilities for further detail



## Implementation Tip: Promoting Awareness

### Analytics Roadshow Raises Awareness to the Availability of Resources

The University of Maryland University College’s analytics team’s focus on data modeling has helped eliminate many inbound requests. Self-service has reduced an estimated 50% of ad hoc requests concerning academic programs and reduced overall ad hoc requests by approximately 20%.

To promote awareness of the resource, the team first unveiled the academic program dashboard to the provost and her direct reports. These conversations ensured that the dashboard would help department chairs and program directors answer the questions for which the provost’s office had the most interest.

Next, the team introduced academic program leaders to the dashboard’s content and capabilities. The knowledge that the provost’s office had already been introduced to the dashboard helped promote adoption and use.

#### A Tiered Approach: Unveiling the Dashboard to Sequential Constituencies



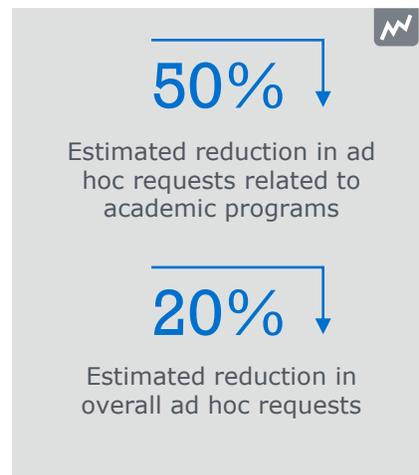
##### *Provost and Direct Reports*

- Ensure the dashboard provides the academic program directors data to meet senior leadership’s needs
- Communicate the availability of data that department chairs and program directors may access



##### *Department Chairs and Program Directors*

- Obtain feedback on user experience
- Note that senior academic leaders are aware of the kind of data available for data-informed decision making



# Tactic 7: Standardized Program Evaluation Metrics

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## Tactic in Brief

The standardization of key academic program metrics enables cross-program comparison for academic leaders. The development of one data source for these metrics, which campus leaders designate as the single source of truth, compels the adoption of standardized metrics and collection processes.

## Problems Addressed

Program-level data is often collected, stored, and defined inconsistently across programs, making cross-program comparison difficult to impossible. Lack of agreement on standard processes and definitions leads campus members to rely more on intuition and experience for decision making than on data use. These challenges result in academic leaders having access only to performance data in years during mandatory program reviews, which may be three to seven years apart.

## Implementation Guidance



- Institution type: Four-year, public
- Enrollment: 52,800 (46,900 undergraduates)
- Maclean's classification: Comprehensive
- Campus setting: Large city (Toronto, Ontario)

# Where Program Review Breaks Down

## Data More of a Source of Contention than Guidance

While data is one of the primary insight drivers for academic program review, campus members' distrust of data makes conversations concerning program review unproductive.

Campuses collect varied data for academic program review, from faculty productivity to program outcomes. However, stakeholders encounter access issues, multiple and potentially conflicting data sources, and face different levels of data literacy.

Unfortunately, these challenges often lead to intuition and experience trumping data-supported findings in decision making. The lack data reliance results in questions as to the integrity and validity of program review decisions.

### Data Gathered for Program Review...



Faculty Productivity



Scholarship Awards



Course Enrollment



Program Outcomes

### ...Ineffective in Securing Buy-In



#### Access Issues

Data hard—or impossible—to get



#### Multiple Sources

Local and central data sources are on different platforms, no "one-stop shop" for data



#### Inconsistent Data

Standards for data differ across departments, making comparisons impossible



#### Uneven Experiences

Inconsistent understanding of data definitions creates knowledge gaps across campus



### Intuition and Experience Trump Data

Lack of trust in data leads campus members to question its ability to inform academic program review

# A Common Core for Department Review

## Academic Leadership Establishes Standard Metrics for Assessment

At York University, data denial impeded program review discussions. The provost and the vice president of finance and administration created an initiative to identify what metrics should be standardized for all academic programs across the university for program review. This set of metrics was then designated as the single source of truth for academic program data.

The IR department at York helped campus leadership identify what data was available, what new data points should be collected, what data required standardization, and what data could be standardized across programs. IR then built a new data infrastructure to collect this standard set of metrics across all departments.

### Leadership Wish List



Provost and VP Finance lead a process to examine academic and administrative program review, convene leadership team to identify what institutional metrics should be provided and what local data would be required to inform the examination:

- What metrics are available?
- What metrics need to be provided to each program?
- What are the gaps in data?
- How should metrics inform process?

### Reality Check



IR reviews data practices and standards across departments, builds data infrastructure to integrate data systems to create standard set of metrics



### Standard Metrics



- All programs' reports include the same metrics with the same definitions
- Executive designation serves as the single source of truth

#### From Adding Data to Adding Value

“As you build a data-informed culture across an institution, you want to get rid of the business of ad hoc data dumping. You want to systematize and make the regular data points as easy to access as possible.”

*Sarah Cantrell  
Executive Director Institutional Planning and Analysis  
York University*



# Breaking Through the Noise

## York University's "Program-at-a-Glance" One-Pagers

The campus-wide agreement that the chosen data elements will be collected and standardized for all academic programs has enabled academic leaders at York University to make more informed decisions. Previously, many academic leaders brought data to the table that suited their interests; now, all academic programs must report the same metrics.

A snapshot of the program summary is below. The summary contains over 70 metrics from student enrollment to program outcomes. A list of all metrics included in the program summaries can be found in the Implementation Resources section of this book on pages 95-99.

### A Snapshot of Program Trends



A. Admissions (Academic Year)	2009	2010	2011	2012	2013	2014*	Trend
1.0 Applications	3,318	3,664	4,008	4,209	4,492	4,533	
1.1 Applications 101-Domestic	2,211	2,457	2,752	2,985	3,060	3,077	
1.2 Applications 101-International	57	67	59	65	70	80	
1.3 Applications 105-Domestic	809	900	933	865	1,063	1,023	
1.4 Applications 105-International	241	240	264	294	299	353	
2.0 Offers	1,914	1,940	2,050	2,369	2,533	2,739	
2.1 Offers 101-Domestic	1,600	1,598	1,750	1,958	2,000	2,184	
2.2 Offers 101-International	32	39	34	44	32	51	
2.3 Offers 105-Domestic	200	232	193	246	386	366	
2.4 Offers 105-International	82	71	73	121	115	138	
3.0 Accepts	421	437	442	558	600	566	
3.1 Accepts 101-Domestic	304	307	328	407	398	367	

**Agreement Most Important**  
 The metrics included in the standardized program data sheet matter less than the creation of a common understanding of program trends and how the data will inform decision making

### Standardizing Departmental Performance Management

- **Admissions:** Applications, offers, accepts, and registrations
- **Major Information:** First majors, second majors, and minors
- **Student Enrollment:** By home program, different program but home faculty, and different faculty
- **Course Information:** Breadth of courses offered and number of students in courses
- **Retention Rates:** One- and two-year retention rates, by same program at university, different program at university, or no longer enrolled
- **Degrees Awarded:** Honors degrees and three-year degrees conferred
- **Graduation Rates:** Original cohort size, and four-, five-, six-, and seven-year graduation rates

Source: EAB interviews and analysis.

# Speeding Time to Insight

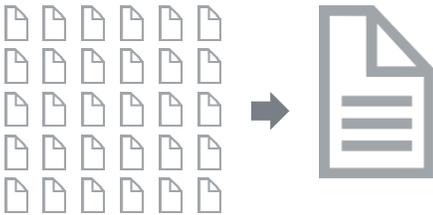
## A Win-Win Situation for Academic Leaders and IR

Both academic leaders and decision support have benefitted from York University's standardized academic program summaries.

Academic leaders now have one source for all program-level data that institutional leadership has agreed is most important. Previously, program review data was only collected when programs were up for review—every seven years. Now, the IR team updates the program summaries twice per year.

Decision support no longer has to access several sources for data points and the program summaries have lessened the number of basic requests received by IR. The process for creating the program summaries has also sparked a data quality audit across the university and academic leaders now possess more confidence in the institution's data.

### From a Sea of Data to Useful Information



**30**

sources used to obtain data

**1**

program summary

#### Data Quality Audit

Creation of the one-page documents identified areas of poor data collection for critical data elements (e.g., paper processes never entered into ERP)



#### Every Day No Longer a Crisis

“By providing this information, it’s allowed us to be more proactive than reactive. We’re not living every day in crisis putting out fires all the time. In the past couple months, the ad hoc requests that I’m getting have significantly decreased, and the types of questions we get have changed from ‘what has happened?’ to ‘what does this mean for our future?’”

*Sarah Cantrell  
Executive Director Institutional Planning  
and Analysis  
York University*

# Tactic 8: Semi-customizable Department Scorecards

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## **Tactic in Brief**

Unit directors develop performance metrics customized to their specific mission from a standard set of options developed by a university-wide office. All units must also report a set of standard metrics.

## **Problems Addressed**

When choosing metrics for unit evaluation, institutional leaders often err toward one of two extremes. Allowing units to report on any non-standard metrics they choose makes cross-unit comparisons impossible, but only using a set of standard metrics may encourage deviance from unit-specific missions to excel in standard metrics.

## **Implementation Guidance**



- Institution type: Four-year, private
- Enrollment: 15,900 (6,600 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Midsized city (Durham, North Carolina)

# Standardized and Customized

## Enabling Program Comparison While Offering Flexibility

York University’s standardization approach may not be appropriate for all campus units, which possess unique missions not covered by standard metrics. In response, Duke University created semi-customizable department scorecards to reap benefits from both standardization and customization.

Most universities lack an objective, regular review process for multidisciplinary centers and institutes, leading resource allocation decisions to be based on inconsistent metrics that are disconnected from performance evaluations.

In many cases, the center director creates a unique set of metrics that reflects the center’s particular mission and priorities but makes cross-center comparisons impossible. At the other extreme, institutions measure

all centers by the same set of standard metrics, which creates perverse incentives that steer center leaders away from their most important goals related to the mission and purpose of the center.

At Duke, the multidisciplinary program office determines a set of metrics that all centers must track. Center directors and multidisciplinary program office staff develop an additional set of mission-related performance metrics. Center directors then select a subset of these metrics customized to their specific missions.

These scorecards recognize a variety of goals, create a system for promoting these goals, and hold centers accountable for their performance against both standard and custom metrics.

### Research Institute Scorecards<sup>1</sup>



	Social Science Research Institute	Nicholas Institute for Environmental Policy Solutions	John Hope Franklin Center for Interdisciplinary and International Studies
<b>Tracked Across All Institutes</b>	<ul style="list-style-type: none"> <li>University funding/total funding</li> <li>Square feet per administrative FTE</li> </ul>		
<b>Customized for Each Institute</b>	<b>Education and Research Metrics</b> <ul style="list-style-type: none"> <li>Students graduated/trained</li> <li>Proposal volume and success rate</li> <li>Faculty collaboration</li> </ul>	<b>Policy Impact Metrics</b> <ul style="list-style-type: none"> <li>Newspaper stories citing faculty/staff</li> <li>External requests for consultation</li> <li>Number of outreach publications</li> </ul>	<b>Scholarship and Outreach Metrics</b> <ul style="list-style-type: none"> <li>Publications and citations</li> <li>Symposia and conference attendance</li> <li>Student participation in workshops/events</li> </ul>

#### A Prix Fixe Menu

Beyond the metrics that all institutes must report, research center directors may select optional metrics from a set of metrics developed in collaboration with multidisciplinary program office leaders. This enables cross-institute comparisons while allowing for variation according to mission.

1) Illustrative.

Source: "Competing in the Era of Big Bets," EAB (2009); EAB interviews and analysis.



# Upskilling Distributed Analytics Staff

*Problem: A focus on technical skill sets over decision support skills for analytics staff leads to lack of assistance in decision making.*

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PART

3

- Tactic 9: Analytical Competencies Road Map
- Tactic 10: Matrix BI Reporting Lines
- Tactic 11: Business Analyst Cross-Training
- Tactic 12: Data-into-Action Awards
- Tactic 13: Just-in-Time Expert Network

# Expectations Developing Faster Than Support

## Struggling to Develop Data-Informed Decision Makers

Campus leaders' expectations for data-informed decision making are developing much faster than support for the activity—a theme common to both higher education and private industry.

In the 2012 EDUCAUSE article, "No More Excuses," Arizona State University President Michael Crow explains the necessity of analytics to better understand institutional operations and opportunities. However, most institutions have been slow to invest in professional development for data-informed decision making.

Campus leaders often struggle to trust data in decision making—either the data itself or the methods used for analysis. However, campus leaders and managers are being pressured by others to make data-informed decisions anyway. Campus leaders' lack of confidence in institutional data or decision making inhibits confidence in their own—and others'—data-informed decisions.

### We Must Become Data-Informed...

"At [Arizona State University], I could see that we would not be able to innovate fast enough without analytics. Without analytics, we can't understand what's going on, we can't understand the complexity of what we're trying to do, and we can't measure our progress. We needed tools to help us make better decisions—about everything... Every facet of the institution requires robust analytics."

*Michael Crow  
President  
Arizona State University*

### ...But Are We Ready?

"An increasing number of managers must take action based on analytical results. But unlike the earlier adopters who embraced analytical approaches, these more recent adopters are not as well versed in the concepts, tools, systems and techniques of contemporary analytics. They are not comfortable making decisions based on analytical approaches that they do not fully understand. Yet they must still make these decisions."

*Kimberly Holmes  
Senior Vice President of Strategic Analytics  
XL Group*

Source: Michael Crow, Renee A'Hearn, and Jameela A-mohanadi, "No More Excuses: Michael M. Crow on Analytics," EDUCAUSE (2012); Sam Ransbotham, David Kiron, and Pamela Kirk Prentice, "Minding the Analytics Gap," MIT Sloan Management Review (2015); EAB interviews and analysis.

# What Can We Expect of Our Campus Leaders?

## Made Not Born: Data-Informed Decision Making Not an Inherent Skill

The lack of professional development for data-informed decision making is exacerbated by the reality that many academic leaders are promoted based on contributions to scholarship or teaching, not on management ability.

Academic leaders are often placed in advanced administrative roles with non-academic, administrative responsibilities. They are expected to make decisions about budgeting and resource allocation with minimal guidance on how to do so. This lack of guidance drives the demand for data specialists within units across campus for decision support—not just within administrative units but academic schools as well.

### Academic Leaders Promoted Based on Scholarship and Teaching, Not on Management

Lecturer



Assessed on:

- Subject matter expertise
- Student evaluations
- Contribution to curricular development



Researcher



Assessed on:

- Quality and quantity of peer-reviewed publications
- Grant dollars secured for research purposes
- Contributions to theory



Administrator



Assessed on:

- Financial acumen/budgeting
- Resource allocation decisions
- Policy and procedure creation

#### A Much Different Role

Administrative responsibilities vastly different from previous expectations as faculty members, leading to hiring of distributed decision support staff

# A Tour of Decision Support Functions Across Campus

## Everyone Wants to Be in on the Data Action

Taking a walk across campus, one would identify that many units are now staffing their own decision support functions, from enrollment management to the college of engineering.

As Dave Swartz, the CIO at American University said about his experience on campus with distributed units, “More campus members are coming to the recognition that they have to have internal, in-house skills to fully leverage the potential that BI offers.”

At most institutions, however, these functions typically act independently of each other. This lack of scaled efforts causes duplicative analytics work across campus.

### Question: What Do These Units All Have in Common?

Information Technology



Office of Advancement



Enrollment Management



Provost's Office



School of Medicine



College of Engineering



### Beyond Central Abilities

“More campus members are coming to the recognition that they have to have internal, in-house skills to fully leverage the potential that BI offers.”

David Swartz  
Chief Information Officer  
American University

Answer: All of these units have their own decision support functions—individual staff or entire teams—acting independently of each other

# A Programmer with a New Business Card

## Distributed Data Support Specialists Lacking Decision Support Capabilities

Along with distributed analytics staff acting independently of each other, these staff often possess outdated skill sets that do not meet the current needs of campus decision makers. In the past, unit directors hired staff with programming skills to pull data from institutional systems. Unit directors have continued to look for similar staff when vacancies arise, out-of-touch with contemporary decision support trends.

However, these staff are typically focused on data retrieval tasks and understanding what happened in the past. Decision makers often desire more detailed understanding of the data and how the data may affect different decisions in the future, which requires data visualization and data modeling skills.

### Legacy Skill Set Not Satisfying Leaders' Needs



*What Distributed Data Support Specialists Provide*

What the data is



What the data means about past performance



What has happened...



*What Campus Leaders Need*

What does this data mean?

What should I do differently because of this data?

What if...

# A Familiar Organizational Tug-of-War

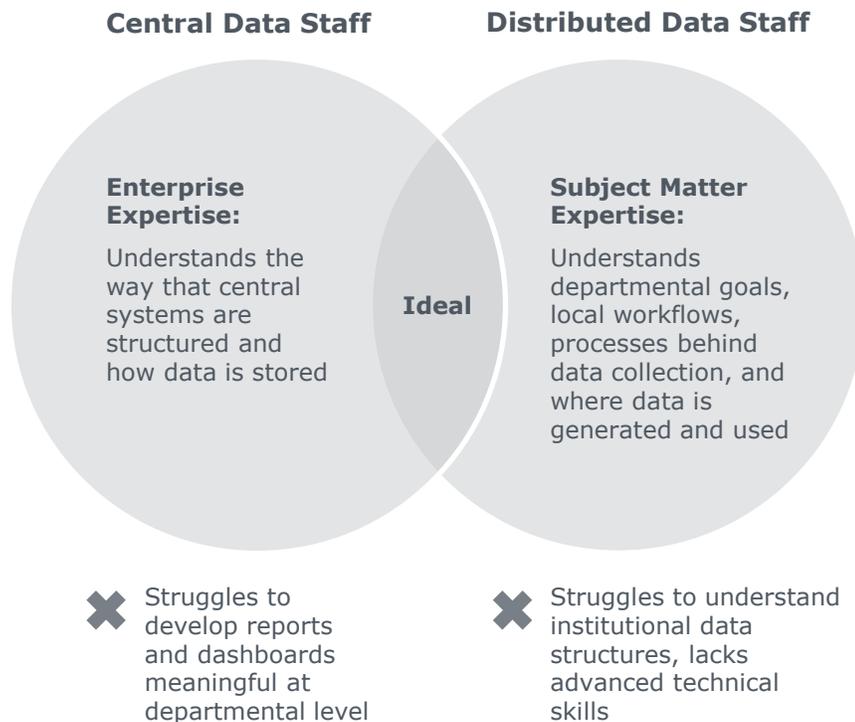
## Challenging to Balance Benefits of Centralization and Decentralization

Most institutions struggle to achieve the benefits of centralization and decentralization, with decision support staff typically generalists in a central office or disconnected from institutional technical systems knowledge in a campus unit.

Centralized decision support staff understand the way that central systems are structured and how data is stored, while distributed staff understand department objectives, local workflows, and where data is generated and used within units. With a lack of communication between these two groups, central staff struggle to develop anything meaningful at the unit

level, while distributed staff struggle to understand institutional data structures and lack advanced technical skills.

Central decision support teams at progressive institutions have forged partnerships with distributed units to ensure that analysts across campus possess the right skills to provide adequate decision support to campus leaders.



# Tactic 9: Analytical Competencies Road Map

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## Tactic in Brief

Central IT departments partner with Human Resources staff to review position descriptions and create a standard set of position descriptions and job pathways for analytics staff. These activities enable IT to proactively assist distributed campus units with identifying the right knowledge and skills necessary to meet unit-level objectives and institutional needs.

## Problems Addressed

As distributed analytics-related positions emerge, campus units struggle to identify the relevant skill sets needed for positions, often hiring programmers who can retrieve data in place of decision support staff. Once analytics staff with the right skill sets are in place, institutions struggle to retain these staff because of high market demand and unclear internal progression pathways.

## Implementation Guidance



- Institution type: Four-year, private
- Enrollment: 9,000 (5,500 undergraduates)
- Carnegie classification: Master's Colleges and Universities (larger programs)
- Campus setting: Large city (Philadelphia, Pennsylvania)



- Institution type: Four-year, public
- Enrollment: 43,600 (28,400 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Midsized city (Ann Arbor, Michigan)

# Making the Right Hires from the Start

## IT as HR Consultant Prevents Hiring for Dated Skill Sets

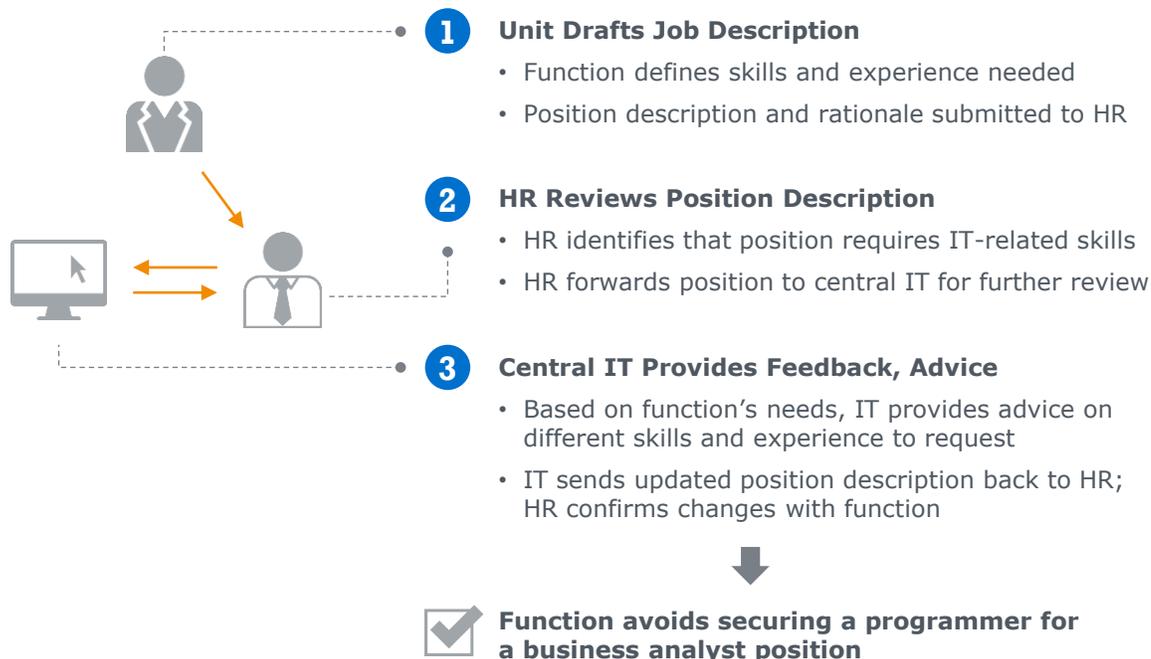
To combat distributed hiring of IT staff with dated skill sets, some institutions' Human Resources departments have integrated central IT into the hiring process through job description reviews.

At Saint Joseph's University, campus units must submit job descriptions for review through the central HR office. If HR staff determine that the position is IT-related, the staff forward the position description to IT for further review. The most relevant IT director (e.g., enterprise systems) reviews the position objectives and provides advice on modifications to desired skills or experience to best meet the objectives.

The revised descriptions help units attract the right candidates, limiting the number of mid-hires that occur.

This process lends itself to smaller institutions with heavily centralized IT departments, as large universities might be overwhelmed by the reviews required. Larger institutions should consider building a self-service toolkit to help distributed units with hiring and promoting analytics staff (see the following page).

### Inserting IT in Position Description Creation



Source: EAB interviews and analysis.

# Promoting Self-Service for BI Hiring

## Competency Road Map Helps Recruit and Retain Distributed Analytics Staff

Many institutions struggle to hire decision support staff because of prohibitive costs. High market demand also leads to struggles in retaining these staff.

The University of Michigan found that a critical element underlying their failure to retain analytics-focused staff was the lack of a clear progression for these staff across campus. The IT department thus created a BI competency road map for campus units to consider when hiring, developing, and promoting analytics-related staff.

These convenient “just-add-water” job descriptions helped campus units hire for necessary skills. The IT department also benefits because the analytically-skilled campus members help reduce the decision support burden on central offices.

### BI Analyst Intermediate

- Build basic reports to support functional processes and inform business decisions
- Defines, measures, and analyzes function KPIs
- BA/BS; 3-5 years experience
- Reporting, database, and data visualization skills



### BI Analyst Senior

- Build advanced reports to support functional processes and inform business decisions
- Leads data modeling projects to enhance BI performance
- BA/BS; 5+ years experience
- Customer service and communication skills



### BI Director

- Create and execute a BI vision for analytical solutions
- Promote use of data for decision making within the function
- MBA/BS; 8+ years experience
- Staff management and leadership skills



### BI Project Manager

- Manage BI project cost, quality, and timeliness
- Proactively identify and prioritize business process improvement opportunities
- BA/BS; 5-7 years experience
- Project management skills



### Toolkit Mutually Beneficial for IT and Campus Managers

#### IT

- Distributed analytics staff hired with right skill sets, eliminating IT re-work

#### Campus Managers

- Plug-and-play job descriptions offer convenience

Source: “Business Intelligence Market Titles,” University of Michigan; EAB interviews and analysis.

# Tactic 10: Matrix BI Reporting Lines

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## Tactic in Brief

Distributed decision support analysts report to department directors to support units' individual but maintain a dotted-line reporting structure to central decision support. Unit directors possess prioritization authority for the workload of their staff. The central decision support director manages a pool of analysts who provide assistance to units without dedicated analytics staff and support to distributed analysts as necessary. This structure helps align data resources, subject matter knowledge, and institutional strategy to meet local and institutional needs.

## Problems Addressed

A data intelligence mismatch exists between central data experts and subject matter experts. Central decision support teams, removed from day-to-day operations, struggle to understand the needs and priorities of campus members. Subject matter experts, without an understanding of campus systems outside their domains, fail to identify promising applications of new data sets for their units.

## Implementation Guidance

**Creighton**  
UNIVERSITY

- Institution type: Four-year, private
- Enrollment: 8,200 (4,100 undergraduates)
- Carnegie classification: Master's Colleges and Universities (larger programs)
- Campus setting: Large city (Omaha, Nebraska)

# Embedding Communication Lines Across Campus

## Matrix Structure Combines Subject Matter and Enterprise Expertise

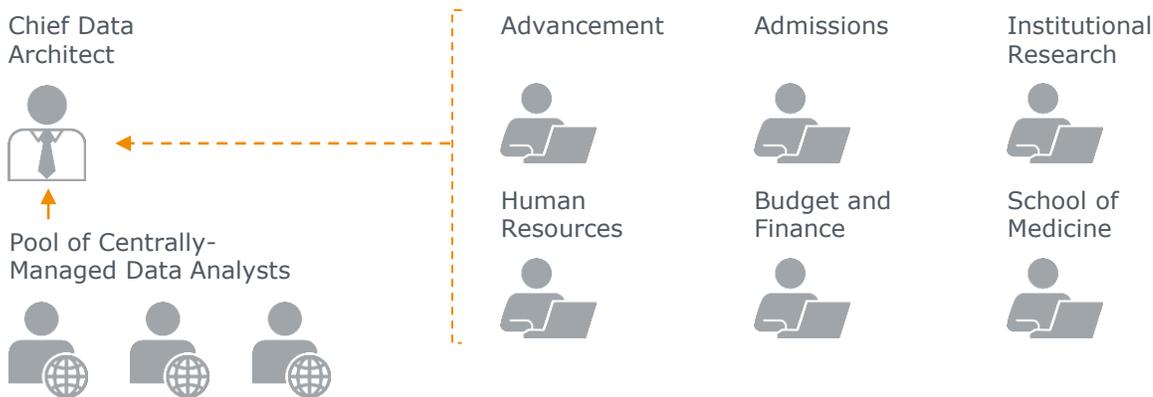
To benefit from central expertise with data structures and distributed subject matter expertise, Creighton University implemented a matrix BI reporting structure for distributed analytics staff.

Several campus units manage their own analytics staff, such as advancement, admissions, human resources, and some academic schools. While these staff are physically located within their units and report to the unit directors, they also possess dotted reporting lines to the central decision support director on campus. The unit staff are dedicated to their units' needs but benefit from regular check-ins with the chief data architect.

The decision support director also maintains a pool of central data analysts to provide coverage to units without dedicated analytics staff and to provide extra support to the distributed analysts as needed.

The central decision support team plans to partner with distributed units to build domain-specific data marts; the primary team member from the function to assist in this effort will then possess the basic skills required to be that function's dedicated analyst.

### Distributed Data Staff Report to Unit Heads, Maintain Dotted-Line Reporting to Chief Data Architect



**Global Support**  
Centrally managed analysts cover units that lack dedicated data analysts and provide support to the distributed analysts as required

**Expanding the Talent Pool**  
Creighton University leaders plan to expand the number of embedded analysts by building departmental data marts with individuals across campus units; the individuals then possess the basic skills to serve as their unit's embedded analyst

# Removing Ad Hoc Requests from BI

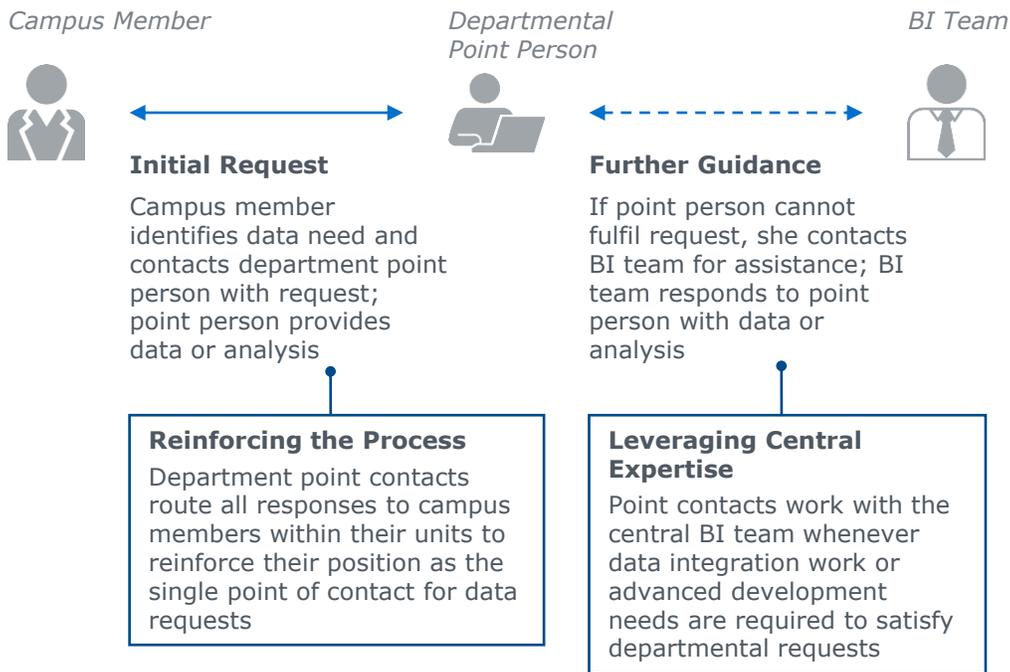
## Limiting the Low-Value-Added Work of Central BI

An organizational structure with departmental point contacts can limit the amount of ad hoc requests to which central decision support teams must respond.

If the departmental analyst receives a request and requires further assistance (e.g., the request requires advanced data manipulation skills), he or she may contact central decision support for assistance. The point person is responsible for all communication with individuals within their unit to reinforce their position as the primary data contact. If the request can be addressed by the departmental analyst, the central BI does not become involved.

Dedicated unit-level analysts understand how to prioritize their own functions' requests better than central decision support staff, who often lack contextual information and struggle to prioritize requests appropriately.

### Triaging Data Requests Through Departmental Points of Contact



# Tactic 11: Business Analyst Cross-Training

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## Tactic in Brief

Business intelligence teams partner with business school faculty to cross-train BI staff in business analysis, visual communication of data, and change management. The cross-training provides BI staff with the soft skills necessary to support campus leaders' decision making needs.

## Problems Addressed

Distributed campus analytics staff typically possess technical backgrounds and understand how to retrieve and manipulate data. However, they struggle to provide decision support to decision makers as they lack skills in presenting data to others, communicating data visually, and using data to support others' decision making. Typical BI training programs focus only on how to use a tool technically, not how to apply the tool to business needs or develop business analysis skills.

## Implementation Guidance



- Institution type: Four-year, private
- Enrollment: 13,000 (7,700 undergraduates)
- Carnegie classification: Doctoral/research universities
- Campus setting: Large city (Washington, District of Columbia)

# Moving Beyond Basic Tool Training

## Developing Decision Support Analysts, Not Just Data Retrievers

Most institutions' business intelligence training programs teach analytics staff how to use BI tools technically but fail to provide the soft skills staff need to provide decision support to campus leaders. These trainings often result in a disconnect for staff between knowledge of the tool and ability to ask analytical questions on behalf of campus decision makers.

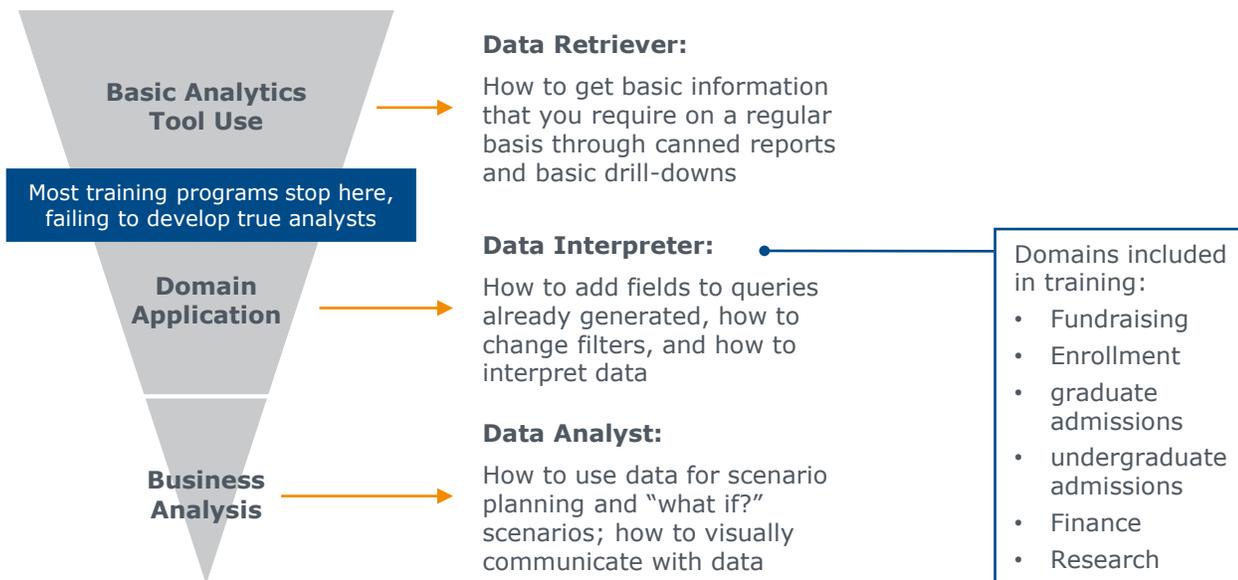
American University's BI team recognized this problem and decided to expand its training program for unit-based analytics staff in two keys ways—holding domain-specific sessions and providing business

analysis-focused training. Participants in domain-specific sessions benefit by learning from subject matter experts who understand the day-to-day applications of data within their domains. Those who attend the business analysis-focused trainings learn to apply their technical skills to university business problems and communicate analyses to other campus members.

### Moving Beyond Tool Training to Better Meet Decision Support Needs



AMERICAN  
UNIVERSITY  
WASHINGTON, DC



Source: EAB interviews and analysis.

# Implementation Tip: Leveraging Internal Intelligence

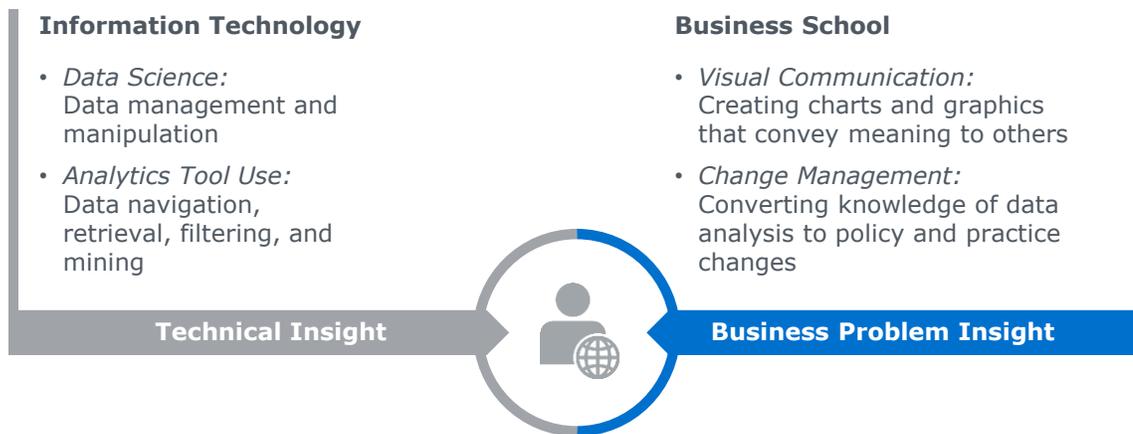
## Partnering with the Business School for Analyst-Level Training

While IT can teach technical skills such as database administration and analytics tool operation, other campus units may be better suited to provide analysis-focused training.

At American University, faculty from the Kogod School of Business teach analytics tools users how to communicate visually with data, how to explain insights to campus decision makers, and how to make data-informed decisions. The goal of the sessions is to transform staff who may excel at data retrieval to those who can provide decision support.

In return, BI staff should consider guest lecturing in business school classes about their experiences with analytics, creating a symbiotic relationship between the academic and administrative sides of the institution.

### Partnership Elevates Capabilities of Distributed Analysts



#### Returning the Favor

Business intelligence staff can teach courses or individual lectures on topics such as data visualization or information management



# Tactic 12: Data-into-Action Awards

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## Tactic in Brief

An awards program highlights examples of departments making creative use of BI systems. The awards demonstrate the value of BI tools, building awareness among employees of BI resources and the potential benefits to be gained from using BI reports and dashboards.

## Problems Addressed

Despite extensive investment in BI systems, users fail to realize the full potential of these tools. The distributed nature of many analytical efforts leads to a lack of knowledge across the institution of locally developed solutions that might benefit other campus members.

## Implementation Guidance



- Institution type: Four-year, public
- Enrollment: 43,600 (28,400 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Midsized city (Ann Arbor, Michigan)

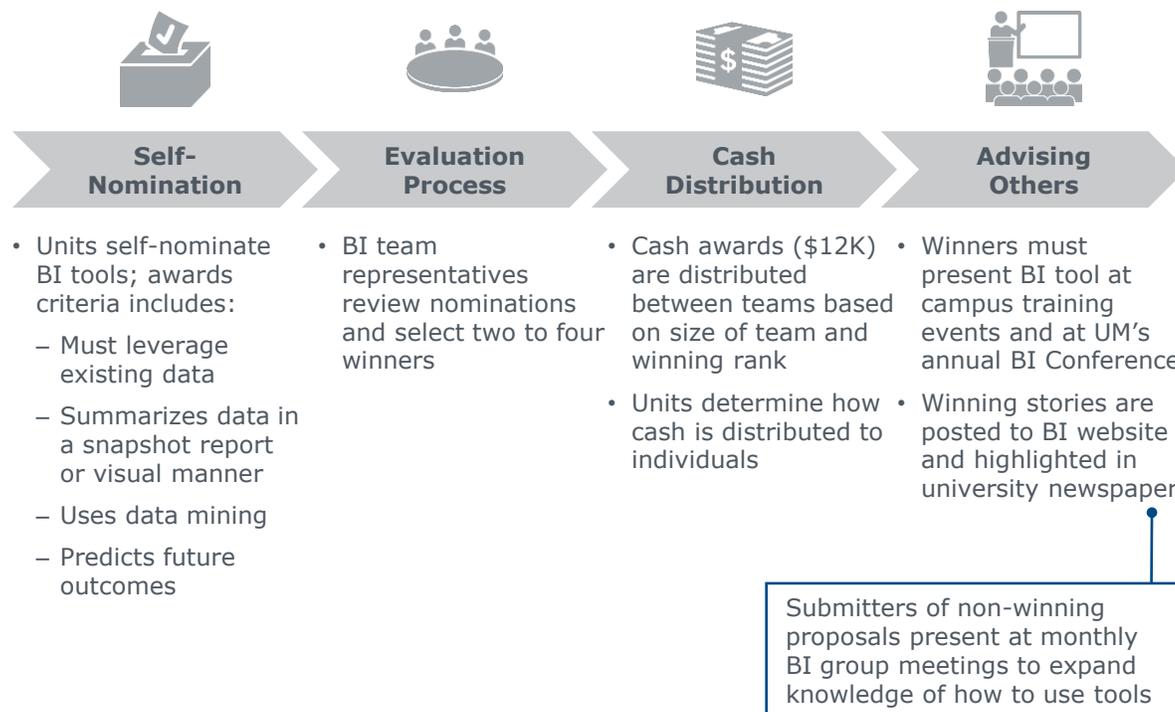
# Putting a Spotlight on Existing BI Initiatives

## Three-Year BI Awards Program Shines a Light on BI Advancement

The decentralized nature of universities can leave central administration and its various units unaware of the host of successful business intelligence initiatives taking place across campus. In many cases, these BI tools could be effectively applied to other schools or colleges.

To create awareness among campus constituents, the Office of Information and Technology Services at the University of Michigan launched an awards program to spotlight the best uses of data analytics across campus.

The Office of Information and Technology Services allocates \$12,000 annually to a cash awards program. Schools and colleges self-nominate successful BI tools and an advisory panel selects two to four winners each year. In addition to receiving a cash prize, winners share their story with peers on campus via training events and an annual university BI conference



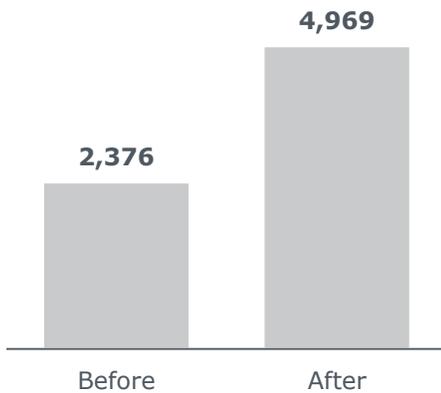
# Small Investments Paying Big Dividends

## Awards Program Increases Campus Awareness and Adoption of BI Tools

Since the creation of the University of Michigan’s Data-into-Action Awards program, university has experienced increased adoption of existing BI tools. For example, management-related M-Reports were featured at the annual BI conference and experienced an 82% increase in adoption that year. Through the awards program, schools and colleges see how their peers across campus use business intelligence—making the migration to BI much more attractive. Today, the demand for BI tools far outpaces the ability to deliver solutions across campus.

The success stories shared during the annual BI conference also helped demonstrate BI’s value to campus, leading to increased funding for IT’s BI efforts.

**Annual Hit Frequency in M-Reports, Before and After Awards Program**



M-Reports, a featured winner of the awards program, saw an 82% increase in adoption in one year



**Creating Awareness**

“The awards program was established to create awareness of decentralized BI initiatives. The success stories of individual units attracted the attention of internal and external audiences—including deans—further building the case, and support, for BI.”

*Laura Patterson  
CIO and Associate Vice President Information and Technology Services  
University of Michigan*

**\$1M** ↑

increase in BI budget the same year the institution’s budget decreased by \$50M, largely because of the demonstrated value of BI to the university

Source: “Developing a Data-Driven University,” EAB (2010); EAB interviews and analysis.

# Tactic 13: Just-in-Time Expert Network

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## Tactic in Brief

Online user group discussion forums allow for analytics practitioners to ask each other questions and assist with peers' problems.

## Problems Addressed

Support for distributed analytics staff is provided inefficiently, as business intelligence staff typically help users on an individual basis, such as an office hour environment. This structure suffers from low attendance, those who require support often wait until a session to receive assistance, and support provided in this matter is not scaled to the rest of campus.

## Implementation Guidance



- Institution type: Four-year, public
- Enrollment: 42,200 (33,000 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Large city (Tucson, Arizona)



- Institution type: Four-year, public
- Enrollment: 43,600 (28,400 undergraduates)
- Carnegie classification: Research university (very high research activity)
- Campus setting: Midsized city (Ann Arbor, Michigan)

# One-Off Responses Not Easily Scaled

## Analytics Community Typically Siloed

A wealth of analytics knowledge exists across campus, but often analytics staff lack connections to one another across campus.

At many institutions, central BI teams support campus members through individual help sessions, such as open office hours. However, these sessions attract few attendees and the assistance provided lacks scalability.

To benefit from distributed staff knowledge, some institutions have started connecting analytics practitioners through online networks to enable them to receive help from each other.

### Many Users, Many Opportunities for Questions and Learning



≈ 750

unique analytics users each day

≈ 40

analyses generated per user each day

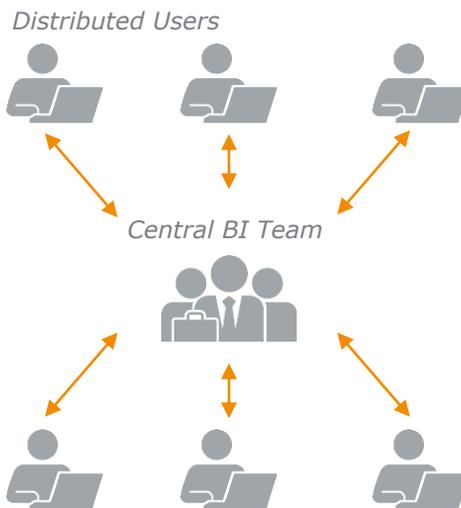
≈ 1.4K

unique analytics users each week

> 150K

analyses generated each week

### Typical Line of Communications for Analytics Is Bidirectional



⚠ Problems solved for individuals, not campus

⚠ BI keeps responding to similar problems from multiple people

# It Takes a Village

## Leveraging Community Expertise to Solve Individuals' Problems

The University of Michigan created an Analytics and Business Intelligence Community through Google+ to connect hundreds of analytics practitioners across campus.

The forum enables central BI to better communicate updates and announcements to interested campus members. The forum also allows staff to ask each other questions related to tool use or data analysis.

In many cases, staff members answer each others' questions the same day that they are posted. The open question-and-answer format provides multiple campus members insight into solutions and guidance that would have previously only been sent to an individual.

Leveraging distributed campus members' experience may help central BI teams focus more on strategic work, while promoting knowledge transfer across the institution.

### University of Michigan's Analytics and Business Intelligence Community Proving Popular

### Large Community Leads to Same-Day Answers with Minimal IT Involvement



>400

members in Google+ community

#### Topic Areas:

- Announcements
- Tips and Questions
- Career Opportunities
- Emerging Tools
- Training Resources
- News

Wendy B, Sept. 25:

*"Is anyone familiar with Level of Detail expressions? I'm trying to calculate a rate of events in a hierarchy using an overall total as a denominator... but when I attempt to look at one event type in a control chart, the denominator changes to the count of rows with that event, despite the EXCLUDE..."*

Rachel R, Sept. 25:

*"Here's an article that helped me..."*

Wendy B, Sept. 25:

*"That was **exactly** the answer I needed! Thank you so much!"*

# Summarizing Group Activity

## Synthesis of Questions and Responses Fosters Community Learning

At the University of Arizona, the BI training coordinator summarizes forum activity in a weekly update to provide more easily accessible guidance.

The training coordinator provides a short description of the problem, relevant details, and the eventual solution. Rather than reading through the back-and-forth conversations within posts, users can quickly read the need-to-know information from the summaries.

### Community Discussions



- Campus staff interact in discussion boards on topics such as:
  - General analytics
  - Financials
  - Budget
  - Employee records
  - Student records
  - Academic Advising
  - Research



### Weekly Updates



- Analytics outreach specialist summarizes discussion board posts from past week. Content includes:
  - Descriptions of the problem and findings of recent questions
  - Tips and suggestions for better use of reports and dashboards
  - Training opportunities



### Faster Root-Causing for Easier Consumption

*"Heather was having trouble getting downloaded information to behave properly. She'd download data from the Current Account Balances dashboard, then try to have Excel add two decimal places to a couple of the data columns. It just wouldn't work. After an extensive amount of testing, it turned out that the only thing that needed to happen was that Heather needed to clear the cache on her browser."*



# Implementation Resources

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APPENDIX

## Using the Appendix Resources

In the following pages, the IT Forum has provided resources that CIOs can use on campus to help implement best practices.

Please reach out to your dedicated advisor or a member of the IT Forum team if you are interested in learning more about other tactics in this report or to speak about implementing these practices in your own campus environment.

More implementation resources can also be found on our website, [eab.com](http://eab.com).

# Templates and Tools

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### **Tool 1: Institutional Factbook Configurator**

*Workbook Views in Cornell University's Factbook*

page 87

### **Tool 2: Role-Based Recommendation Engine**

*Implementation Tips from the University of Washington*

page 92

### **Tool 3: Data Quality Assurance Certification**

*Indiana University's Badging Vision*

page 94

### **Tool 4: Standardized Program Evaluation Metrics**

*York University's Data Sheets*

page 95

### **Tool 5: Analytical Competencies Road Map**

*University of Michigan Business Intelligence*

*Progressive Position Descriptions*

page 100

## Additional Implementation Resources



Additional implementation resources, covering many of the best practices identified in this study, can be found on the study's webpage.

To learn more, visit:

[eab.com/itf/2016/decisionsupport](http://eab.com/itf/2016/decisionsupport)

# Institutional Factbook Configurator

## Workbook Views in Cornell University's Factbook

### Admissions Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/admissions](http://irp.dpb.cornell.edu/tableau_visual/admissions)

View	Description	Example Filters/Metrics
<b>Fall Freshman Applications, Acceptances, Entering Students and Yield</b>	Four line charts, displaying applications over time, acceptances over time, enrollments over time, and yield over time	<ul style="list-style-type: none"> <li>Academic college</li> <li>Year</li> <li>Sex</li> <li>Application measures (e.g., yield)</li> </ul>

### Tuition Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/factbook-tuition](http://irp.dpb.cornell.edu/tableau_visual/factbook-tuition)

View	Description	Example Filters/Metrics
<b>Tuition and Fees Increases</b>	Two line charts, one containing annual tuition and fees, and one containing percent increase in tuition and fees over prior year	<ul style="list-style-type: none"> <li>Tuition Type (e.g., Non-resident, Resident, Endowed)</li> <li>Year</li> </ul>

### See the Visualizations Online

All workbooks that comprise Cornell University's factbook can be found at:  
<http://irp.dpb.cornell.edu/university-factbook>.



# Institutional Factbook Configurator (cont.)

## Workbook Views in Cornell University's Factbook

### Enrollment Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/factbook-enrollment](http://irp.dpb.cornell.edu/tableau_visual/factbook-enrollment)

View	Description	Example Filters/Metrics
<b>At a Glance</b>	Table enabling quick displays of basic annual enrollment data	<ul style="list-style-type: none"> <li>• Student entrance category (e.g., first-time freshmen, undergraduate transfer)</li> <li>• Year</li> <li>• Academic College</li> <li>• Sex</li> <li>• Race/Ethnicity</li> </ul>
<b>Enrollment Details</b>	Two-column table enabling quick displays of two enrollment-related variables together	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Student entrance category (e.g., first-time freshmen, undergraduate transfer)</li> <li>• Year</li> <li>• Degree type (e.g., Research Doctorate, Professional Master's)</li> </ul>
<b>Enrollment Trends</b>	Stacked line chart displaying the annual student headcount by degree objective	<ul style="list-style-type: none"> <li>• Degree type</li> <li>• Academic college</li> <li>• Year</li> <li>• Ethnicity group</li> </ul>
<b>Enrollment by Classification of Instructional Programs Code (2010)</b>	Table displaying the annual student headcount enrolled by CIP code	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• CIP 2010 2-digit code</li> <li>• Year</li> </ul>
<b>Race/Ethnicity/Citizenship Trends</b>	Line chart displaying the annual percent of student headcount over time by ethnicity and citizenship of students	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Academic college</li> <li>• Year</li> <li>• Ethnicity group</li> </ul>
<b>International Enrollment Trends</b>	Line chart displaying the annual student headcount over time by continental area of residency for international students	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Year</li> <li>• Continental are</li> </ul>
<b>International Student Map</b>	Heat map of student headcount density displaying the country of residence for non-United States residential citizens at time of matriculation to Cornell	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Year</li> <li>• Country</li> </ul>
<b>US Student Map</b>	Heat map of student headcount density displaying the state of residence for United States residential citizens at time of matriculation to Cornell	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Student entrance category</li> <li>• Year</li> <li>• State</li> </ul>
<b>New York State Student Map</b>	Heat map of student headcount density displaying the county of residence for New York state residents at time of matriculation to Cornell	<ul style="list-style-type: none"> <li>• Degree level</li> <li>• Student entrance category</li> <li>• Year</li> <li>• County</li> </ul>

Source: Cornell University Factbook; EAB interviews and analysis.

# Institutional Factbook Configurator (cont.)

## Workbook Views in Cornell University's Factbook

### Graduation and Degrees Conferred Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/factbook-graduation-degrees](http://irp.dpb.cornell.edu/tableau_visual/factbook-graduation-degrees)

View	Description	Example Filters/Metrics
<b>Graduation Rates for First-Time Freshman by Cohort's Entrance Year</b>	Stacked bar chart displaying time to graduation by chosen student population (first-time freshmen only)	<ul style="list-style-type: none"> <li>• Time to Graduation</li> <li>• Academic College (of Matriculation)</li> <li>• Sex</li> <li>• Rate and Citizenship</li> <li>• Year</li> </ul>
<b>Graduation Rates for First-Time Freshman by Matriculating College, Race/Citizenship, and Sex</b>	Stacked bar chart displaying time to graduation by chosen student population	<ul style="list-style-type: none"> <li>• Time to Graduation</li> <li>• Academic College (of Matriculation and of Graduation)</li> <li>• Sex</li> <li>• Race and Citizenship</li> <li>• Year</li> </ul>
<b>Graduation Rates for Undergraduate Transfers and First-Time Freshman by Cohort Start Year</b>	Line chart displaying change in graduation rate over time, separated out by first-time freshmen and transfer students	<ul style="list-style-type: none"> <li>• Academic College (of Matriculation)</li> <li>• Sex</li> <li>• Race and Citizenship</li> <li>• Year</li> </ul>
<b>Graduation Rates of Pell Grant and Subsidized Stafford Loan Recipients, First Time Freshmen entering Fall 2009</b>	Table displaying graduation rates for students based on grant and loan recipient status	<ul style="list-style-type: none"> <li>• Pell Grant Recipient Status</li> <li>• Stafford Loan Recipient Status</li> <li>• Need-Based Aid Recipient Status</li> </ul>
<b>Year-to-Year Persistence among Undergraduates</b>	Bar chart displaying persistence rates of students one, two, and three years after matriculation	<ul style="list-style-type: none"> <li>• Academic College</li> <li>• Race and Citizenship</li> <li>• Sex</li> <li>• Year</li> </ul>
<b>Degrees Conferred by Academic Year</b>	Line chart displaying degrees granted based on degree type (e.g., baccalaureate, master's, J.D.)	<ul style="list-style-type: none"> <li>• Academic College</li> <li>• Year</li> </ul>
<b>Degrees Conferred by Classification of Instructional Programs Code (2010)</b>	Table displaying the degrees awarded per year by CIP code	<ul style="list-style-type: none"> <li>• Degree Type</li> <li>• Year</li> </ul>

# Institutional Factbook Configurator (cont.)

## Workbook Views in Cornell University's Factbook

### Academic Employees Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/factbook-academics](http://irp.dpb.cornell.edu/tableau_visual/factbook-academics)

View	Description	Example Filters/Metrics
<b>Academics at a Glance, Fall 2015</b>	Table enabling quick displays of basic annual academic workforce data	<ul style="list-style-type: none"> <li>• Semester</li> <li>• Sex</li> <li>• Faculty Rank</li> <li>• Academic Function (e.g., Faculty, Instruction, Research, Library, Extension)</li> <li>• Faculty Who Also Hold Executive Positions</li> </ul>
<b>Academic Workforce, by College</b>	Table containing counts of academic workforce by academic college	<ul style="list-style-type: none"> <li>• Faculty or Academic Professional</li> <li>• Year</li> <li>• Faculty Who Also Hold Executive Positions</li> </ul>
<b>Faculty Details</b>	Two-column table enabling quick displays of two demographic-related variables together for faculty	<ul style="list-style-type: none"> <li>• Tenure-Track Status</li> <li>• Faculty Rank</li> <li>• Sex</li> <li>• Minority Status</li> <li>• Age</li> </ul>
<b>Faculty Hires and Faculty Departures</b>	Individual tables, one containing new tenures and tenure-track appointments, and one containing departures of tenured and tenure-track faculty	<ul style="list-style-type: none"> <li>• Faculty Rank</li> <li>• Academic College</li> <li>• Sex</li> <li>• Year</li> </ul>
<b>Promotions of Faculty: Tenured and Full Professors</b>	Individual tables, one containing promotions and appointments to tenure, and one containing promotion from tenured faculty to full professor	<ul style="list-style-type: none"> <li>• Academic College</li> <li>• Sex</li> <li>• Year</li> </ul>
<b>Academic Professional Detail</b>	Two-column table enabling quick displays of two demographic-related variables together for academic professionals	<ul style="list-style-type: none"> <li>• Academic Function</li> <li>• Full-Time or Part-Time</li> <li>• Sex</li> <li>• Minority Status</li> <li>• Age</li> <li>• Year</li> </ul>
<b>Academic Composition by Race/Ethnicity/Citizenship</b>	Line chart displaying proportion of academic workforce by ethnicity	<ul style="list-style-type: none"> <li>• Faculty or Academic Professional</li> <li>• Ethnicity</li> <li>• Year</li> </ul>
<b>Academic Workforce, Distribution by Age</b>	100% stacked column chart displaying proportion of academic workforce by age	<ul style="list-style-type: none"> <li>• Academic Function</li> <li>• Sex</li> <li>• Age</li> <li>• Year</li> </ul>

Source: Cornell University Factbook; EAB interviews and analysis.

# Institutional Factbook Configurator (cont.)

## Workbook Views in Cornell University's Factbook

### Non-Academic Employees Workbook

[http://irp.dpb.cornell.edu/tableau\\_visual/factbook-nonacademic-staff](http://irp.dpb.cornell.edu/tableau_visual/factbook-nonacademic-staff)

View	Description	Example Filters/Metrics
<b>Non-Academic Staff at a Glance, Fall 2015</b>	Table enabling quick displays of basic annual non-academic staff data	<ul style="list-style-type: none"> <li>• Sex</li> <li>• Minority Status</li> <li>• Occupational Group (e.g., Executive, Technical, Clerical)</li> <li>• Organizational Sector (e.g., Colleges, Research, Library)</li> <li>• Year</li> </ul>
<b>Non-Academic Staff by College</b>	Table containing non-academic staff headcount by college	<ul style="list-style-type: none"> <li>• Academic College</li> <li>• Sex</li> <li>• FLSA Status</li> <li>• Occupational Group/Staff or Union Status</li> <li>• Year</li> </ul>
<b>Non-Academic Staff by Sector</b>	Line chart displaying change over time in non-academic staff headcount by organizational sector	<ul style="list-style-type: none"> <li>• Organizational Sector</li> <li>• Full-Time or Part-Time</li> <li>• Sex</li> <li>• Race and Ethnicity</li> <li>• Age Group</li> <li>• FLSA Status</li> <li>• Staff or Union Status</li> <li>• Occupational Group</li> <li>• Year</li> </ul>
<b>Distribution of Non-Academic Staff by Age</b>	100% stacked column chart displaying proportion of non-academic staff by age	<ul style="list-style-type: none"> <li>• Organizational Sector</li> <li>• Sex</li> <li>• Year</li> </ul>
<b>Distribution of Non-Academic Staff by Occupational Group</b>	Line chart displaying change over time in non-academic staff headcount by occupational group	<ul style="list-style-type: none"> <li>• Full-Time or Part-Time</li> <li>• Job Groups (based on 2013 IPEDS classifications)</li> <li>• Year</li> </ul>

# Role-Based Recommendation Engine

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## Implementation Tips from the University of Washington

### Overview

The University of Washington BI Portal (<https://biportal.uw.edu/>) uses classic recommendation algorithms to provide Item-Item recommendations (Similar Reports) and User-Item recommendations (Recommended Reports).

These features are used for navigation and discovery of the BI Portal.

### Background

Many reporting systems have activity logs with weeks or months of history. These logs are the basis for recommendations, because any widely-used reporting system can be used for collaborative filtering.

In particular:

- Reports that are run by the same user, in close time proximity, may be related
- When a pair of reports is run by many users in close time proximity, they are highly likely to be related
- Users who run a report often would benefit from related reports, especially if they have not run it recently (and therefore don't know about it)

### Report Linkages

Recommendations are identified by calculating a 'weight' or 'linkage' metric for report pairs run by the same user. That metric can be aggregated by report pairs to calculate Report-Report recommendations, or by user-report combinations to calculate User-Report recommendations. There is one notable change from the classical approach to recommendations related to exponential decay.

### Exponential Decay

Reports are related when they are run in relatively short succession. For example, if two reports are run 24 hours apart, they may be related. Two reports that are run 72 hours apart, however, are far less likely to be related. As a result, there's an exponential decay function.

# Role-Based Recommendation Engine (Cont.)

## Implementation Tips from the University of Washington

### Similar Reports

“Similar Reports” are an example of Item-Item recommendations. In e-commerce, the description for the results would be, “People who ran this report also ran these reports.”

Given report-report weights,  $F(R_1, R_2)$ , the most similar reports are the ones with the largest weights.

### Recommended Reports by User

Recommended Reports are an example of User-Item Recommendations. Another description for them would be, “Reports we think you’ll like.”

Given user-report weights,  $F(U, R_x)$ , the report recommendations for a user U are the ones with the highest weights.

**Variables**

- U = A user
- R<sub>1</sub> = Report 1
- D<sub>A</sub> = Date of R<sub>1</sub>'s run
- R<sub>2</sub> = Report 2, which is run by a user *later* than R<sub>1</sub>
- D<sub>2</sub> = Date of R<sub>2</sub>'s run

**Report Pair Weight by User**

The weight function,  $F(U, R_1, R_2)$ , is for a specific user and report pair. Reports that are run in close time proximity are given a higher weight.

$$F(U, R_1, R_2) = \sum_{D=1}^{\infty} 1 / (D_2 - D_1)^{0.1}$$

**Report-Report Weight**

The weight function,  $F(R_1, R_2)$ , is for a report-pair. It is the sum of report pairs from the previous function,  $F(U, R_1, R_2)$ .

$$F(R_1, R_2) = \sum_{U=0}^{\infty} F(U, R_1, R_2)$$

**User-Report Weight**

The weight function,  $F(U, R_x)$ , is for a report R<sub>x</sub> and a specific user, U. This is calculated by the sum of report-report weights when a user has run the first report, R<sub>1</sub>, but not the second report, R<sub>x</sub>.

$$F(U, R_x) = \sum_{R=1}^{\infty} F(R_1, R_x) \exists \{U, R_1\} \nexists \{U, R_x\}$$

Source: Anja Canfield-Budde, Director of Enterprise Data and Analytics, University of Washington; EAB interviews and analysis.

# Data Quality Assurance Certification

## Indiana University's Badging Vision

### In Decision Support, What Is Badging?

Decision Support makes it easier for the Indiana University community to find existing reports and dashboards. The discovery tool uses badging to indicate the data quality of a report. A badge is represented graphically as a transparent "ribbon" layered over the lower right corner of a report icon.

Not every report will have a badge. Initially, badges will be assigned upon request. Report owners will be asked about the report's data source, update frequency, and whether its information has been used externally and sanctioned by University Institutional Research and Reporting (UIRR).

### Badging Categories

There are four badging categories: platinum, gold, silver, and bronze. Badging is mainly determined by the source of the data.



**Platinum:** Uses central systems and is externally reported and sanctioned by UIRR



**Gold:** Uses data strictly from centralized systems



**Silver:** Uses data from a mixture of centralized systems and local data (data may also be locally calculated or interpreted)



**Bronze:** Uses data generated or maintained in a decentralized system (data reliability is subject only to local norms). Bronze is also considered the "users' choice" badge for reports using decentralized data. Its reports must be published on Decision Support for at least six months, rated at least four stars, and have at least five votes.

# Standardized Program Evaluation Metrics

## York University's Data Sheets

### Undergraduate Program Information Data Sheet

*Illustrative Data; Full Tables Can Be Found on Pages 96-99*

A	Admissions (Full Academic Year)	2008	2009	2010	2011	2012	2013	2014
1.0	Applications	--	3,318	3,664	4,008	4,209	4,492	4,533
1.1	Applications 101-Domestic	--	2,211	2,457	2,752	2,985	3,060	3,077
1.2	Applications 101-International	--	57	67	59	65	70	80
1.3	Applications 105-Domestic	--	809	900	933	865	1,063	1,023
1.4	Applications 105-International	--	241	240	264	294	299	353



### Speeding Time to Insight

In York University's data sheets, each line of the table also includes a trend line for increased legibility; trend lines highlight the years with the lowest and highest numbers within the period.

2009	2010	2011	2012	2013	2014	Trend
3,318	3,664	4,008	4,209	4,492	4,533	

### Additional Information Available Online

Definitions for all the data elements listed in the following pages, as well as an example graduate program data sheet, can be found in the "Form Data to Decisions" toolkit, at [eab.com/itf/2016/decisionsupport](http://eab.com/itf/2016/decisionsupport).

# Standardized Program Evaluation Metrics (cont.)

## York University's Data Sheets

### Undergraduate Program Information Data Sheet

#### Illustrative Data

A	Admissions (Full Academic Year) <sup>1</sup>	2008	2009	2010	2011	2012	2013	2014
<b>1.0</b>	<b>Applications</b>	--	3,318	3,664	4,008	4,209	4,492	4,533
<b>1.1</b>	Applications 101-Domestic	--	2,211	2,457	2,752	2,985	3,060	3,077
<b>1.2</b>	Applications 101-International	--	57	67	59	65	70	80
<b>1.3</b>	Applications 105-Domestic	--	809	900	933	865	1,063	1,023
<b>1.4</b>	Applications 105-International	--	241	240	264	294	299	353
<b>2.0</b>	<b>Offers</b>	--	1,914	1,940	2,050	2,369	2,533	2,739
<b>2.1</b>	Offers 101-Domestic	--	1,600	1,598	1,750	1,958	2,000	2,184
<b>2.2</b>	Offers 101-International	--	32	39	34	44	32	51
<b>2.3</b>	Offers 105-Domestic	--	200	232	193	246	386	366
<b>2.4</b>	Offers 105-International	--	82	71	73	121	115	138
<b>3.0</b>	<b>Acceptances</b>	--	421	437	442	558	600	566
<b>3.1</b>	Acceptances 101-Domestic	--	304	307	328	407	398	367
<b>3.2</b>	Acceptances 101-International	--	3	9	7	7	9	9
<b>3.3</b>	Acceptances 105-Domestic	--	84	98	76	98	150	143
<b>3.4</b>	Acceptances 105-International	--	30	23	31	46	43	47
<b>4.0</b>	<b>Enrollments</b>	--	--	390	394	469	506	483
<b>4.1</b>	Enrollments 101-Domestic	--	--	286	311	372	358	339
<b>4.2</b>	Enrollments 101-International	--	--	7	6	6	9	8
<b>4.3</b>	Enrollments 105-Domestic	--	--	83	61	76	117	114
<b>4.4</b>	Enrollments 105-International	--	--	14	16	15	22	22
<b>5.1</b>	Mean Admit GPA Average of 101 Accepted Students	--	84	85	85	85	85	85
<b>5.2</b>	Percent of 101 Accepted Students with Admit GPA of 75% or Greater	--	97	100	100	100	100	100
<b>5.3</b>	Percent of 101 Accepted Students with Admit GPA of 80% or Greater	--	73	97	100	100	96	90

1) More details about 101 and 105 designated students can be found at <http://www.ouac.on.ca/ouac-101/> and <http://www.ouac.on.ca/ouac-105/>, respectively.

# Standardized Program Evaluation Metrics (cont.)

## York University's Data Sheets

### Undergraduate Program Information Data Sheet (cont.)

#### Illustrative Data

B	Enrollment Heads Home	2008	2009	2010	2011	2012	2013	2014
<b>1.0</b>	<b>First Major Total</b>	1,338	1,405	1,461	1,515	1,549	1,679	1,693
<b>1.1</b>	New First Major Declarants	432	381	392	380	449	511	472
<b>1.2</b>	Continuing First Major Declarants	864	1,006	1,046	1,101	1,083	1,126	1,169
<b>1.3</b>	New First Major Declarants from Other First Majors	19	13	12	23	10	27	18
<b>1.4</b>	Reactivated Students in First Major (After One Term of Inactivity)	18	5	11	11	7	15	34
<b>2.0</b>	<b>Double Major Total</b>	13	7	6	7	9	9	11
<b>3.0</b>	<b>Minor Total</b>	54	70	51	50	36	36	31
<b>5.0</b>	<b>Concurrent Education Bachelor's Participants</b>	12	10	11	8	12	23	17

C	Enrollment FTEs Home	2008	2009	2010	2011	2012	2013	2014
<b>1.0</b>	<b>Total Home Fiscal Full-Time Equivalents (FTEs)</b>	1,237	1,321	1,415	1,450	1,461	1,591	1,617
<b>1.1</b>	<b>FTEs Eligible for Ministry Funding</b>	1,203	1,283	1,367	1,393	1,398	1,525	1,551
<b>1.2</b>	<b>Visa FTEs Ineligible for Ministry Funding</b>	34	38	48	57	63	65	66
<b>2.1</b>	<b>FTEs Taken from Same Major Program</b>	501	545	585	591	566	614	626
<b>2.2</b>	<b>FTEs Taken from Different Major Program, Same College/Faculty<sup>1</sup></b>	346	353	372	348	363	403	408
<b>2.3</b>	<b>FTEs Taken from Different College</b>	291	424	459	511	532	574	584

1) Academic "college" is the equivalent of "faculty" in Canadian higher education institutions.

# Standardized Program Evaluation Metrics (cont.)

## York University's Data Sheets

### Undergraduate Program Information Data Sheet (cont.)

#### Illustrative Data

D	Courses by Responsible Unit	2008	2009	2010	2011	2012	2013	2014
1.0	Course Registration (Heads)	7,437	8,106	8,524	9,449	10,186	10,588	10,774
2.0	Total Unique Courses Offered	48	47	49	58	59	62	62
2.1	Full Courses Offered <sup>1</sup>	2	2	1	--	--	--	--
2.2	Half Courses Offered <sup>1</sup>	46	45	48	58	59	62	62
3.0	Total Fiscal Full-Time Equivalents (FFTEs) Taught by Major Program Instructors	845	930	970	996	1,058	1,103	1,123
3.1	Eligible FFTEs Taught by Major Program Instructors Eligible for Ministry Funding	815	898	938	961	1,013	1,052	1,061
3.2	FFTEs Taught by Major Program Instructors Ineligible for Ministry Funding (International Students)	28	30	30	35	43	50	59
3.3	FFTEs Taught by Major Program Instructors Ineligible for Ministry Funding (Other Students)	2	2	2	0	3	2	3
4.1	FFTEs Taken by Students in Same Major Program	501	545	585	591	566	614	626
4.2	FFTEs in Different Major Program, Same College	178	174	157	154	176	162	159
4.3	FFTEs Taken by Students in Different College	166	211	228	251	316	327	339

E	Retention Rates of New Year One Full Time Nov 1 <sup>st</sup> Und	2008	2009	2010	2011	2012	2013	2014
1.0	New Students by Headcount in Major Program in Year One	389	355	337	329	395	456	413
1.1	Percent of Students by Headcount in Same Major Program One Year Later	80	83	82	82	81	77	--
1.2	Percent in Different Major Program One Year Later	8	5	10	8	8	10	--
1.3	Percent Not Enrolled One Year Later	11	12	8	10	11	13	--
2.1	Percent in Same Major Program Two Years Later	65	66	65	65	63	--	--
2.2	Percent in Different Major Program Two Years Later	15	13	20	18	16	--	--
2.3	Percent Not Enrolled Two Years Later	20	20	15	17	21	--	--

1) Determined by credit count of courses.

Source: York University; EAB interviews and analysis.

# Standardized Program Evaluation Metrics (cont.)

## York University's Data Sheets

### Undergraduate Program Information Data Sheet (cont.)

#### Illustrative Data

<b>F</b>	<b>Degrees Awarded (Calendar Year)</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>1.0</b>	<b>Number of Honors Degrees Granted</b>	90	87	103	131	162	158	179
<b>2.0</b>	<b>Number of 90-Credit (Three-Year) Degrees Granted</b>	68	70	69	55	58	59	74

<b>G</b>	<b>Graduation Rates of New Year One Full-Time Undergraduate Students</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>1.0</b>	<b>New Year One Full Time Students by Headcount</b>	285	298	335	296	389	355	337
<b>1.1</b>	<b>Percent of Students by Headcount Graduated within Four Years</b>	32	23	30	29	25	23	28
<b>1.2</b>	<b>Percent Graduated within Five Years</b>	51	48	58	59	53	52	--
<b>1.3</b>	<b>Percent Graduated within Six Years</b>	61	55	68	66	65	--	--
<b>1.4</b>	<b>Percent Graduated within Seven Years</b>	65	60	70	69	--	--	--

# Analytical Competencies Road Map

## University of Michigan Business Intelligence Progressive Position Descriptions



### Business Intelligence Analyst Intermediate

- *Responsibilities:*

- Develop a comprehensive, cross-functional understanding of business processes, production systems, enterprise-wide data warehouses/sources, and Departmental databases
- Participate in cross-functional teams for increasing the impact/awareness of BI projects, tools, and assist in the presentation/demonstrations of tools and BI solutions
- Conduct business analyses and functional design activities for capturing, loading, storing, and extracting data across the organization
- Design, model, and build data structures, and data mapping routines to support the data and reporting requirements for all areas of the organization
- Participate in strategic assessments to identify current/emerging business issues/problems and contribute to defining high impact business intelligence solutions with a focus on the quantitative methods, modeling and analytical techniques
- Develop reports and definitions, graphs, dashboards and portal interfaces appropriate for audience

- *Education and Experience:*

- BA or BS in quantitative field
- 3 to 5 years of experience

- *Additional Information:*

- Employees in this classification typically analyze, compare and evaluate various courses of action and have the authority to make independent decisions on matters of significance, free from immediate direction, within the scope of their responsibilities. Primary activities and decision making authority are predominantly performed independently affecting business operations to a substantial degree. Under FLSA, incumbents in this position meet the criteria for exempt status.

# Analytical Competencies Road Map (cont.)

## University of Michigan Business Intelligence Progressive Position Descriptions



### Business Intelligence Analyst Senior

- *Responsibilities:*

- Conceptualize and develop cross-functional client/unit strategic objectives, business processes, and initiatives that drive or increase organizational value
- Manage and/or administer the design and development of data structures and data extracts to support comprehensive data collection, loading, and extraction for complex analyses
- Participate in strategic assessments to identify current/emerging business issues/problems and contribute to defining high impact business intelligence solutions with a focus on the quantitative methods, modeling and analytical techniques
- Lead and guide business process improvement discussions leading to advice on potential problem resolutions including gathering the support and resources for BI initiatives
- Develop and present reports and definitions, graphs, dashboards and portal interfaces appropriate for audience
- Assist in identifying and leading change management processes for new/improved business processes/BI tools and resources
- Manage cross functional unit projects and/or teams which include project planning, task management, status reporting, etc.

- *Education and Experience:*

- BA or BS in quantitative field
- 5+ years of experience

- *Additional Information:*

- Employees in this classification typically analyze, compare and evaluate various courses of action and have the authority to make independent decisions on matters of significance, free from immediate direction, within the scope of their responsibilities. Primary activities and decision making authority are predominantly performed independently affecting business operations to a substantial degree. Under FLSA, incumbents in this position meet the criteria for exempt status.

# Analytical Competencies Road Map (cont.)

## University of Michigan Business Intelligence Progressive Position Descriptions



### Business Intelligence Project Manager

- *Responsibilities:*

- Responsible for unit and cross-functional project management leadership and overall success of reporting deliverables and data management projects
- Prepare and manage project charge documents outlining deliverables and manage projects tracking costs, quality, and timeliness; report on project metrics, reporting outputs and timelines
- Manage project/program budgets and perform periodic cost and productivity analyses
- Coordinate with various business and technical groups whose support is needed to build or deploy data warehouses/applications/portals
- Proactively identify and prioritize business improvement areas and develop and drive appropriate solutions and results
- Lead change management processes for new/improved business processes/BI tools and resources

- *Education and Experience:*

- BA or BS (e.g., finance, marketing, accounting, information systems)
- 5 to 7 years of experience

- *Additional Information:*

- Employees in this classification typically analyze, compare and evaluate various courses of action and have the authority to make independent decisions on matters of significance, free from immediate direction, within the scope of their responsibilities. Primary activities and decision making authority are predominantly performed independently affecting business operations to a substantial degree. Under FLSA, incumbents in this position meet the criteria for exempt status.

# Analytical Competencies Road Map (cont.)

## University of Michigan Business Intelligence Progressive Position Descriptions



### Business Intelligence Director

- *Responsibilities:*

- Establish, promote, and execute an integrated Business Intelligence vision/plan for the delivery of decision-making information and analytic solutions to key stakeholders
- Develop and promote innovative approaches for the use of strategic decision data throughout all levels of the organization, working closely with business sponsors, business subject matter experts and Information Technology to ensure that high business value solutions are planned and executed
- Develop and direct BI strategy, architecture, and budgets; coordinate program and project managers, information architects, and analysts
- Develop ongoing marketing and communication programs for Business Intelligence plans and activities across the University/enterprise
- Link and leverage business intelligence with the enterprise's strategic goals, provide advice and consulting assistance to executive leadership
- Direct and lead staff members reporting to this position, including hiring, performance management and professional development

- *Education and Experience:*

- MBA or MS in quantitative field
- 8+ years of experience

- *Additional Information:*

- The primary duty of employees in this classification is the management of a customarily recognized department or subdivision, including the supervision of three or more full-time equivalent employees every week. Direction is over a permanent status-continuing function, not a collection of employees assigned to complete a project. Management duties include interviewing, selecting and training of employees; setting and adjusting their rates of pay and hours of work; planning and directing their work; appraising their productivity and efficiency for the purpose of recommending promotions or other changes in their status; handling their complaints and grievances and disciplining them when necessary. Management responsibilities include the authority to hire, fire, or promote assigned employees or make recommendations that are given particular weight. Employees have impact on budgeting, controlling costs, planning, scheduling, and procedural change. Under FLSA, incumbents in this position meet the criteria for exempt status.





# Advisors to Our Work

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APPENDIX

# Advisors to Our Work

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The IT Forum is grateful to the individuals and organizations that shared their insights, analysis, and time with us. We would especially like to recognize the following individuals for being particularly generous with their time and expertise.

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