DIVING INTO DATA:
Designing Dashboards

By Catherine Breen, Govind Narasimhan, and Thomas B. Spencer

I n August 2015, we presented a senior forum session on metrics called, "Research-Related Metrics: Operational Monitoring, Planning and Strategy" at the NCURA Annual Meeting. The participants were experienced and well versed in data extraction, reporting, and analysis. There were common themes in our discussion and also in the follow up questions after the session. One theme stood out. Almost all participants wanted to know how to best present data. This article provides readers with concrete suggestions for the components and visual structure of short interactive reports that pull out important themes, often called dashboards.

Dashboards present key metrics at a glance, which is an important but difficult task. As research administrators, we know that the volume of data and information can be overwhelming. However, there are ways to effectively distill and depict our data. Consider some examples from the federal government.

One tool that the government is using is the federal IT Dashboard, which is a set of web-based graphs and tools that allows federal agencies, industry, and the public to view detailed information about federal investments in technology and track how well they are performing. The IT Dashboard has pie charts that represent the current distribution of investments and graphs that show the trend of the distribution over time. The dashboard is interactive, and viewers can click on the graphics to get at underlying detail (www.itdashboard.gov). Another example is the Federal Workforce At-a-Glance dashboard, released by the Department of Personnel Management to support diversity and inclusion at the federal level by fostering an "inclusive work environment" (www.opm.gov). A third example comes from OMB, which recently unveiled an initiative that will allow agencies to measure and track progress on federal infrastructure projects, including transit, railways, and bridges "to further improve the efficiency and quality of review, which would cut review timelines while also improving environmental and community outcomes(www.performance.gov)."

Not surprisingly, dashboards are also becoming more widely used at universities, non-profit organizations, and in state and local government because they are a helpful tool for analyzing data at a glance. So exactly should a dashboard be designed and what information should it contain? Below you will find some ideas for distilling and depicting data in a meaningful way.

What Should a Dashboard Look Like?

The goal is to design useful dashboards that meet the needs of research administration. The best people to reach that goal are research administrators who understand what data elements matter and which are going to be measured.

Anyone tasked with making raw data useful has seen the challenges of building dashboards first-hand. The concepts of presentation, on-demand availability, and of course usefulness can seem overwhelming. However, breaking down the concept of dashboards and how they are designed can be done with visual representations of data. But why do we visualize?

Visual representations, in the form of dashboard data are valuable to decision makers who need status updates for important information. Dashboards, when designed and implemented correctly, are powerful tools that can enable successful business intelligence. What sets dashboards apart from standard reports? Dashboards are interactive windows into the metrics.

One of the largest benefits of dashboards is that they give the reader information at a glance. Instead of leafing through a dense report packed with too much information, dashboards provide visual images that depict status and progress and indicate trends. People can find patterns and can understand what is working, what is not, and what is different. Dashboards allow users to drill down into useful data while filtering unnecessary noise, allowing managers to have an understanding of what is broken and what is working. Dashboards, when done correctly, will verify these things, provide an ability to identify what is different, and determine if the outlier is a problem or a part of the solution.

How are dashboards built and which should you use? Bars, lines, or pies? Sounds like a fun restaurant, but these are choices that will become important as the dashboards begin to take shape.

The process for building dashboards varies, but articles and guidance suggest that the overall process should be similar no matter the final product. In the 2007 article, *Seeing is believing: Designing visualizations for managing risk and compliance,* Rachel Bellamy breaks the process down into a series of steps. In very simplified terms: 1) interview the users to understand the need; 2) design the prototype and review; 3) deploy, and; 4) update. Look to the federal examples for ideas, and then add the details and complexities of research administration.

For example, for research administrators a financial dashboard may provide a look into the top five highest dollar proposals that will be submitted in the next three months. This dashboard may be a simple visual representation of five bars that can drill down into the details if selected.

Another financial dashboard may be the direct expenditures for all faculty that can be divided into departments or into high visibility or high priority projects.

It is only natural to reflect on what data elements to measure and understand, which may differ based on the internal or external users, and what provides meaning to one's institution. Financial metrics that may be meaningful include proposal and award data, as well as expenditures and revenues. Cost transfers, deficits, residual balances, cash balances, A/R, and deferred revenue are all candidates for meaningful financial metrics when measured as ratios. Academic medical centers may contemplate measuring gifts dollars received from patients on a clinical trial, hospital or routine care revenue received from patients to measure value of clinical research, the ratio of diverse population in a clinical trial to measure the underserved groups are being represented in research, and service center operations supporting certain patient care delivery. Universities that offer start up and retention funds may measure the return on investment (ROI) by developing metrics to measure productivity ratios from such faculty by analyzing proposals, awards, revenues, publications, etc. from faculty who received start-up funds. External users of metrics and financial data may review financial items of interest, such as sponsored projects revenue (direct and indirect), endowment value, revenue from investments, number of days cash on hand, etc.

Non-financial data elements that may offer measureable metrics include percent compliance with conflict of interest; publications including author position; percentage of faculty diversity for women and minorities; ratio of tenure / tenure track faculty to fellows, trainees and post docs; and research space by department vs. research space by PI.
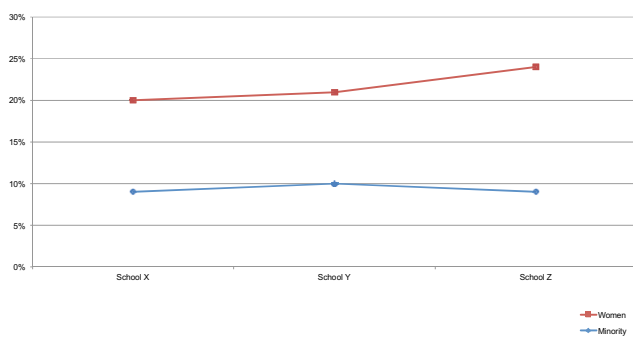
Questions and discussions following both the National and Regional NCURA meetings this year demonstrate that there is a growing appetite in research administration for metrics, analytics, and dashboard reports. This trend, when tied to the Federal Data Act, cannot be ignored. Learning the process to create dashboards and what they contain is a powerful process. NCURA and its members are at the leading edge of knowing what must be captured and what provides value to you. Learning how to create effective and useful dashboard reports can help you highlight your data in meaningful ways and capture the attention of stakeholders and decision makers. N

Funding to be submitted in next 90 days

Direct Costs Account Balance
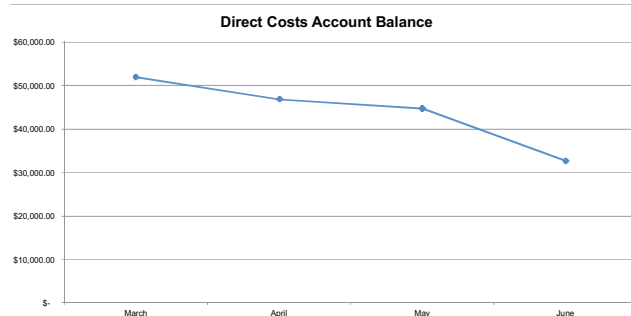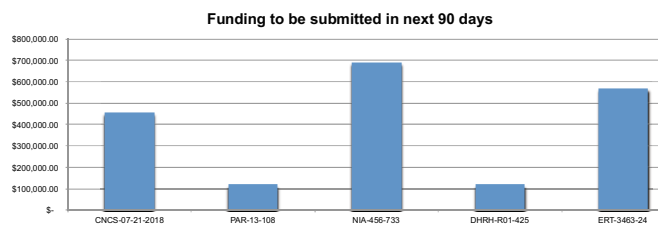
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