

Striking a Balance – Visualizing Data, Communicating Information, and Creating Knowledge

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Highlights of the NASH Study

The NASH work highlighted a number of areas of focus that can guide improvement of the IR function. This webinar is organized by these four critical focus areas, and details specific examples of how the University of Texas System has organized work within the focus areas.

These areas are:

1. Define the system role,
2. Meet increased demand,
3. Shift focus for the future, and
4. Expand areas of strength/depth.

As I step through this webinar, I will come back to these organizing themes.

Define the System Role

In terms of defining the System role, the NASH work found an effective operational model to be characterized by collaboration through effective data sharing between the two levels (system and campus), a high degree of differentiation between System and Campus roles, the existence of standardized data definitions across the campuses within the system, and the ability to leverage the strength of the System to break through barriers – be it financial, political, or otherwise.

Overview of UT System

As a precursor to discussing how UT System defines the System role – first a brief overview of our system which is comprised of: [see slide]

The University of Texas System Organization

The System office is organized by a Board of Regents that leads the System and hires the System Chancellor. The Chancellor has a number of Vice Chancellors who report directly to him. The office appearing under the microscope for this webinar is my office – the Office of Strategic Initiatives (OSI) – which is the UT System IR Function, among other things. The critical take away here is that as Vice Chancellor of Strategic Initiatives, I have a direct reporting line to the Chancellor, which puts the IR Function in a powerful position to impact policy.

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The Big Picture at UT System: System's Role in IR

The Office of Strategic Initiatives (OSI) serves five main functions *vis a vis* the campuses:

1. Collects data from campuses,
2. Standardizes data definitions,
3. Aggregates and centrally stores data,
4. Looks for patterns and connections that are relevant across multiple campuses; analyzes and transforms data to information,
5. Leverages information for strategic purposes.

Meet Increased Demand

The NASH work identified an increased demand for IR offices to meet both internal needs to inform decision making and improve performance, but also to meet external needs for accountability and transparency. These increasing demands lead to the evolution of a data and information culture within UT System. Really, there were two critical foundational areas that had to evolve within OSI in order to build this data culture. These foundational areas are data use and data delivery.

Evolution of Data Culture at UT System

Focusing on the evolutionary nature of our data culture – there was very little change in data usage from the 1970s through the early 2000s. Around 2003, culture change began with a focus on accountability and transparency. In 2010-2011, new leadership accelerated the pace of change and the culture shifted to a greater focus on incorporating data into decision making. Now, let's look at the specific steps in this process

1970s to 2000s Fact Books

During the 1970s through the 2000s, our main mode of data delivery was printed fact books and reports. There was no System IR office, the number of descriptive metrics was limited, and few visuals were used. [see slide]

2003 Accountability & Transparency

The conversations around higher education started moving towards accountability and transparency during this time. This was really solidified by the publication of the Spellings Commission report in 2006. With this, the UT System moved from printed reports to online PDFs, to the formation of a UT System IR office, a new focus on outcomes-oriented metrics with more charts and graphs, and the addition of providing our data in context to peers and national and state benchmarks.

2011 Framework for Excellence

In 2011, Chancellor Francisco Cigarroa unveiled his strategic visioning document, which we call the Framework for Advancing Excellence. His strategic vision calls for campuses to establish concrete and measurable goals for 2015, 2020, and 2025, for 24/7 interactive access to data, and calls for public

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display of data on the web – an important take away here is that the strategic vision of the Chancellor established system wide goals and called for the campuses to establish individual goals for the system wide plan – this resulted in organizing the system and campuses around the same set of metrics and moving toward them in tandem. As a result of these changes – UT System established a publicly accessible online dashboard. [see slide]

2012-2013 Expansion Efforts

Building on our momentum of 2011, we expanded our focus in 2012 and 2013. [see slide]

2014 Next Steps

We currently have a number of new initiatives underway, which I will discuss in more detail. We are updating seekUT, a new tool for students and parents; undertaking a major revision to the content, organization, and look and feel of our Dashboard, and we are more closely looking at the role of communication in IR.

The Evolution of Data Use at UT System

So, just to draw you back to the thread that brings us here – I mentioned earlier that the two pillars in developing a data culture are data delivery and data use. In terms of data use, the evolutionary process toward data-driven decision making starts with reporting (which typically answers the “*what*” question), moves toward analyzing (which answers the “*why*” question), and then goes to planning, predicting, and improving – the “*what now*” question.

The Evolution of Data Delivery at UT System

Here we have this idea of ease of availability and relevance – or you might call this access and timeliness. More compelling and useful visualizations get the user what they want – they are easier to create and build IR capacity and increase demand for your work. The more quality work that your shop produces that is accessible, relevant, and timely, the more your constituents will utilize your services – which is a good thing.

So ... UT Systems’ evolutionary process of data delivery went from:

Printed Reports (printed reports/fact books) to PDFs on the Web, to Interactive Online Dashboards and Visualizations.

We have two major components to our publicly available interactive dashboards and visualizations – the first, BI / Information Delivery Portal, is what I like to call our encyclopedia of data – which can be found at data.utsystem.edu

Here we have dashboards, Web reports, and the ability for users to interact with the data and build their own tables and charts, as well as download the data.

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Our data visualization (visual analytics) tool provides analyses and data on special topics. It is accessible on an iPad or tablet, and is available to the public at exploredata.utsystem.edu.

Shift the Focus for the Future

The NASH work highlighted the need for IR offices to conduct an assessment of where they are and whether they are structurally and operationally positioned to adapt to current and future demands of the field. An important question in looking toward the future – are your offices well positioned to collect and analyze more complex and larger datasets from a wider variety of non-educational sources and then communicate results to stakeholders? Here at UT System, OSI has transitioned from an old/traditional staff configuration that focused on data collection and management. While those skills still have a critical place in the organization, new skillsets have been added to our office in the areas of communications, data visualizations, information technology, and research.

ORG Chart

This is the organizational chart of our office. The chart is color coded by skillset. The orange is the Communications arm. The two blue areas are IT and Business intelligence, and the orange and blue shaded areas are the emerging skillsets, while the green area represents more traditional IR roles of research and policy analysis.

OSI's Role

OSI's role in shifting the focus for the future has several elements to it.

- **Informs Decision Making, policy analysis, and strategic planning**
- **Supports Data Delivery and Tools**
- **Goes Beyond Reporting**

We seek out new data sources to help better understand student outcomes beyond graduation and create highly focused analyses that include specialized visual tools for our users and relevant metrics. For example, in January of this year, we signed a contract with the Texas Workforce Commission to receive individual level wage records for UT System students. Another example – about a year ago we contracted with the National Student Clearinghouse to receive data at the System level on post baccalaureate education for students at all 15 of our institutions. However with all of this data, we cannot be effective unless we analyze it, communicate it, and effectively present it using technology.

Communication and Technology

The critical take away here is that technology and communication go hand in hand and are more effective together – incorporating communications professionals and technology experts into institutional research offices is critical to telling the complete and compelling story. Even if you are not able to hire individuals with these specializations in your offices (ideal model), strong partnerships and regular meetings with these professionals in your system will go a long way.

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Communication Tools

Our communication tools include Twitter, blogs, and a newsletter. With this workforce data that I mentioned earlier, we created a tool called seekUT for students and parents, which I am going to give you a brief sneak peak at now. This tool is open to the public and available on the Internet. I will start with a student video and then go into the tool.

Expand Areas of Strength and Depth

The NASH work highlighted another important area of focus that can guide improvement of the IR function, and this is a focus on the expansion of areas of strength and depth. UT System is currently making changes and additions to the OSI staff and organizational structure that will allow us to deepen our research and analysis, expand the areas of expertise and focus, and use technology to enhance our communication efforts by employing interactive data visualization tools.

Deeper Research and Analysis

Now that we have built the foundation of our data warehouse and have our data collection processes streamlined, we now have time and demand for our analysts (as a result of building a data culture) to dig deeper into the data and look for connections and patterns, and to develop new methodologies for measuring performance.

Decision Tree

This is a decision tree. Decision trees are used to find relationships between input values and target values. Decision trees use an iterative series of regressions to model data. The decision tree methodology is particularly useful as it allows us to go beyond the one-cause one-effect relationship and discover relationships in context of multiple influences. [see slide]

Our question here is which prematriculated student characteristics (first generation, gender, SAT, Pell Status, URM status, High School Percentile) are the most powerful predictors of graduating in four years?

The way this works is that the model first identifies the most powerful predictor associated with graduating in four years and then further stratifies the sample to run additional regressions, which determine what other variables are impacting the probability of four-year graduation.

This particular model demonstrates that the most powerful predictor is whether the student is first generation or not. First generation students have a 39% probability of graduating in four years versus non first generation at 56%. Then, focusing on those first generation students, you can see that the next variable to predict graduation is SAT scores. And so forth...

This type of analysis is particularly useful for trying to identify populations of students who may need interventions with specific programs.

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Broaden Focus & Expertise

My office has a history of working with revenue data – in particular to provide analyses for the tuition-setting process. And as a result, we have strong relationships with our Business Affairs office. We are working to strengthen existing partnerships within the UT System Administrative Offices by providing operational dashboards. We are also developing new areas of focus, starting to explore healthcare and clinical metrics and different research and productivity metrics. We are also developing a centralized research funding, grant awards, and publications database in order to look at faculty outputs.

Now I am going to show you a short video of the tool that we are developing for our shared purchasing group

Serving Other Offices

Here are some ways you can support other offices/units within your university [see slide].

Examples

As I mentioned earlier, we are working to support the more efficient business operations of administrative offices within the UT System. Currently we are working with Shared Services, Risk Management, and Endowment Compliance to build dashboards that make their data more useful; and at the same time, we are teaching them best practices about data collection and creating metrics, as well as teaching them to maintain the dashboard tool we are creating. Here is a short video that demonstrates the functionality of the shared services portal we are developing

[Video]

Communication & Visualization

Related to making data more useful for the user, here are some tips on communication and visualization of data. Use the power of the tools you already have; Excel can create very powerful visuals with meaningful data that provides context, thus showing your own institution's performance relative to national and state standards, or performance targets or peers. There are a lot of great data visualization tools out on the market. Many of these have the added advantage of allowing the user to guide their experience picking elements they want to focus on in the visual. Leverage communications specialists and technology staff in your system, and get them working together to create story boards and interactive and dynamic slide shows.

Using Data Visualizations

Here are some things to think about when asking yourself – how should I display this particular data?

- Use trend analysis and predictive modeling
- Communicate message to audiences of all levels
- Collaborate with other researchers, educational leaders, visualization experts, and outside agencies
- Provide benchmarks for comparison and/or progress

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Picking the Right Visualization

Here are some questions to ask yourself when you are trying to choose visualization:

- What data do you need to convey?
- What message(s) do you want to communicate?
- Which audience(s) do you want to reach?
- Does it offer a different way of thinking about the data?

Effective Data Visualizations

Two characteristics of effective data visualizations are

- 1) They tell a story by looking for patterns in data. Data combined with the right tools should lead to explanations and discovery
- 2) They make the information consumable [See slide]. It's easier for non-programmers to manipulate/analyze data and create reports.

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