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Big Data On Campus: How IT Leaders Enable Higher Education Analytics



UNITED NATIONS
Educational, Scientific, Cultural Organization

► *Read the report to learn more about global education data and the current trends.*

“Tertiary education continues to expand, growing more than 3% each year. For the first time, in 2012, about one in three adults held a tertiary qualification.”

—OECD (2014), Education at a Glance 2014: OECD Indicators, OECD Publishing

Change isn't coming. It's here.

In a time when big data is becoming a big deal on campus, anyone in higher education knows just how quickly administrative needs and business systems are simultaneously shifting. While university leaders and educators contend with improving graduation rates, advancing research, attracting donors, and cultivating fiscal responsibility with greater transparency, IT managers are continuously burdened with more demands than they have solutions—all within an increasingly complex technology environment.

Furthermore, the world is seeing an uptick in enrollment rates for higher learning. The United Nations Educational Scientific and Cultural Organization (UNESCO) reported a global increase in tertiary education by 3% every year since 2000. Starting in 2012, one in three adults graduated from an institution of higher learning. Simply put, more technology compounded with more students brings an acute sense of urgency to drive organizational improvements and better academic outcomes at universities everywhere.

For any real chance of advancement, both educators and administrators need direct access to data insights in order to drive measurable performance results. More importantly, universities need IT leadership to help build a credible, secure data infrastructure.

Student records, campus-housing surveys, budget allocation, and even profitability all have untapped, need-to-know information in the data, and most of it is idly waiting for discovery.

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“It used to be that we couldn’t even put all of the data into one visualization or one spreadsheet because it would completely go off of the screen... We can now answer almost any enrollment question over the past seventeen years with a few clicks of a mouse. This sort of thing generates a lot of interest within the university and causes people to ask interesting questions, allowing staff to save time by sending people to do their own self-service.”

—Jon Boeckstedt, Associate
Vice President, Enrollment Policy
& Planning DePaul University

The Old Way

People within educational organizations have traditionally accessed data insights via static reports from enterprise applications and business intelligence tools, all managed and used only by the IT department. This old way, predominantly designed and built in the 1990s, is generally complex, inflexible, and time-consuming.

With increasing data volumes, disparate data sources, and a general lack of additional resources, reporting actionable insights at the user levels is presumed difficult or even impossible. The amount and variety of data makes the concept of one-stop data warehouses seem obsolete, even as many institutions still struggle to build their first data warehouse. These circumstances can feel threatening, even out of control. They need not be.

For years, universities, big and small, have relied on limited IT departments to provide answers to data questions, creating a never-ending cycle of long wait times and inflexible results. IT has faced the inverse challenge. They spend dozens of hours churning out reports and responding to requests that often fall short of what the requester needs to know.

Also, because most professors and administrators lack the time and the skills to see and understand their data, they simply don’t use the analytics systems provided by their organizations. As a result, many knowledge workers today rely on spreadsheets as their primary self-service analytics tool, which can be slow, erroneous, and impossible to govern and scale.



► Watch to learn more about how DePaul University democratized their data for better insights.

The New Way

A new generation of technologists hopes to evolve beyond the status quo by empowering individuals to explore their data. Not only is this yielding faster, more insightful decisions, it's also allowing IT leaders to return their focus to their central task of maintaining a secure and reliable data infrastructure.

Many campuses have already adopted a self-service model where teams are shifting away from reacting to requests and toward empowering people to explore the data themselves. Instead of generating reports, these IT teams are enabling access to data with full consideration of security requirements. But even with new data technologies, universities sometimes fall short in their analytics strategies. New approaches demand a new methodology.

Proven agile development and deployment methods adapt quickly to changing requirements. It allows IT and university employees across all departments to work together as partners. We look to a lighter process that empowers people to exercise their natural curiosity.

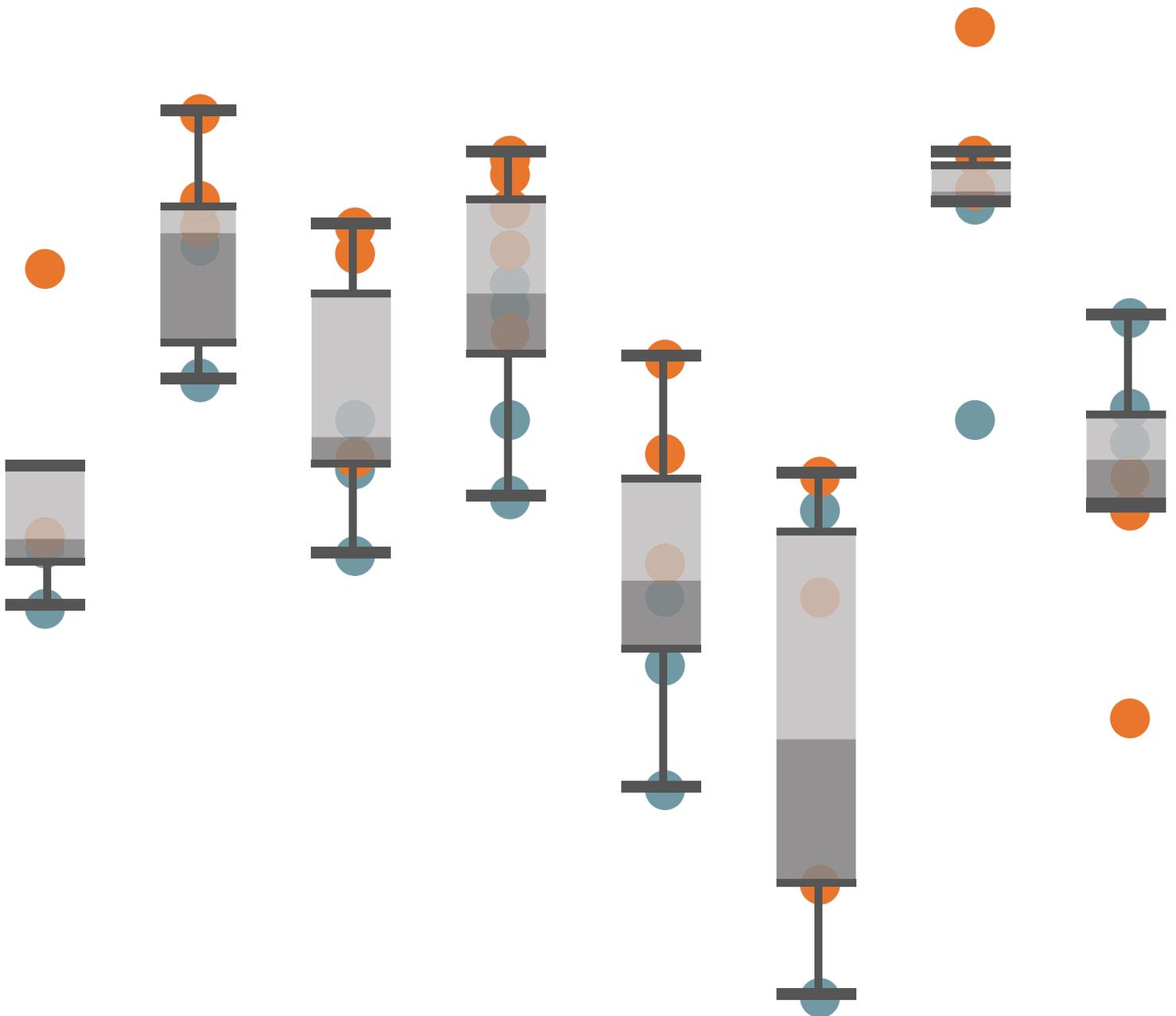
The four attributes of the new way to approach higher education analytics are:

1. Enabling Self-Reliance
2. Speed at Every Phase
3. Flexible & Secure Configurations
4. Visual Understanding



We can now answer almost any enrollment question over the past seventeen years with a few clicks of a mouse.

*Jon Boeckenstedt, Associate Vice President,
Enrollment Policy & Planning DePaul University.*



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—Bart Pietrzak, business intelligence architect at the University of Washington

I. Enabling Self-Reliance:

Because the best analytics implementations are user-created dashboards running on top of IT-managed infrastructure, optimization for self-service is key.

Not only will self-service analytics yield huge dividends for individual administrators, educator, and student outcomes, it will also provide a single source of truth throughout the entire educational institution. And it’s possible to deploy this model while maintaining and protecting the privacy of data assets.

The University of Washington (UW) is rich with data. With more than five billion records, 36 databases, and seven SSAS cubes, the school generates more than 300 reports to fuel thousands of daily decisions within its network. For UW, dated, basic reporting tools were simply not enough to truly harness the power of the data at scale.

Bart Pietrzak, a business intelligence architect at UW, saw an immediate need for self-service data discovery. Pietrzak recognized the critical role for the UW IT leaders.

“Our main job on campus is to bring the data from all the systems, integrate this data to make it easier for consumption, and then deliver it through the BI platforms that we’ve had for some time,” Pietrzak said.

UW wanted to have greater self-service. UW needed to foster collaboration.

“Collaboration for us means a lot of different things—we’ve got three campuses, seven medical centers, we work with partners—we want to have a way to share data across the enterprise. We want to promote and continue what our leadership started, which is data-driven culture. We want to focus on enabling analysts, not developers. We want people to be empowered to use the tool to start interacting with data,” he said.

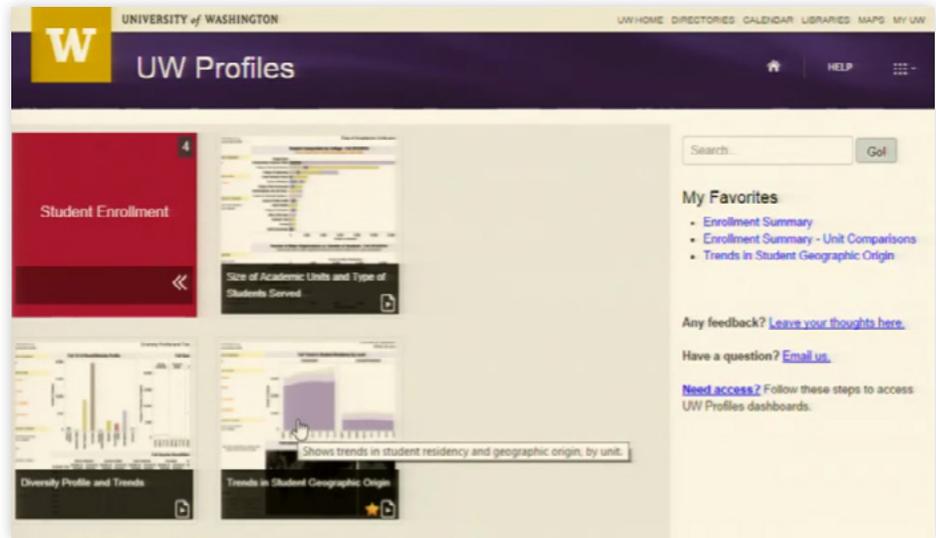
UW is primarily a Microsoft shop. The school uses an SQL server to store and manage data, T-SQL and integration services for ETL, reporting services for reports, and analysis services for cubes. As you can imagine, Excel and Access are widely used on campus.

“We really did not want to replace any of the existing tools that we have at UW. We wanted to expand and provide what we were lacking, which is really a visualization tool that became essential for ad hoc analysis and ease of use,” Pietrzak said.



- ▶ *The University of Washington has one of the largest higher education self-service analytics installations in the world. Watch this presentation to learn how UW IT leadership partnered with departments to deploy enterprise self-service analytics. Hear about their journey from charter to pilot, with approvals, roll out, training and ultimately institutional change.*

In the fall of 2012, the university launched a program called UW Profiles in an effort to empower administrators to see, understand, and make better decisions with student data. UW Profiles is a set of 23 dashboards that visualize data about student enrollment per quarter, number of degrees granted every year, retention and graduation rates.



UW Profiles is a portal accessed with single sign-on where users can choose from specific sets of dashboards to ask and answer their own questions. Within the portal, users can tag favorite dashboards and read detailed overviews of each visualization. They can also interact with the dashboard, drill down with filters, leave user feedback, and even vote on new ideas.

This idea came from the office of planning and budgeting, but the team relied on a partnership with IT leaders for execution.

“The office of planning and budgeting was responsible for creating the dashboards. UW IT was responsible for implementation and technical solution in terms of data. This was different from what we’ve done in the past because we specifically wanted the business users to interact with the data and use the dashboards, not IT. They know what they want,” Pietrzak said.

The best way to build adoption is to make the transition easy for users. UW’s portal is integrated with single sign-on solution, and users don’t have to rely on IT to find their answers. It is all made possible by what administrators and educators don’t see: the data sources that have been set up and managed by IT. This is a key concept: to make the most of a self-service analytics strategy, users need easy to access data.

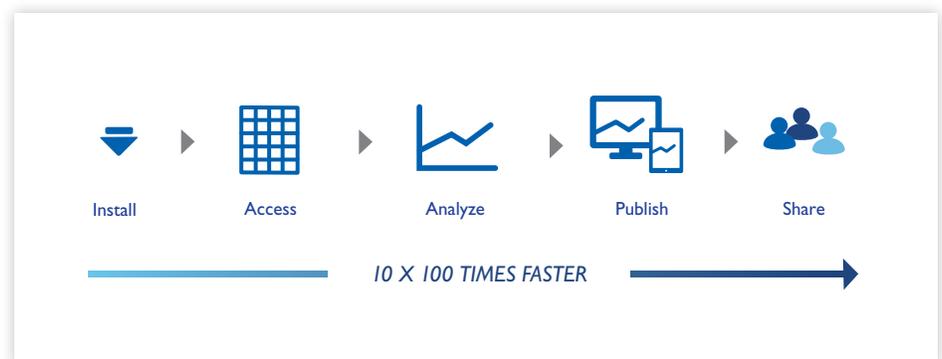
2. Speed at Every Stage:

Saving time in every step of your data workflow is fundamental. From installing software, accessing and analyzing complex data sets, publishing interactive dashboards, and sharing across your institution, for your data to have real impact, speed to insight must be swift.

Realizing the measurable value your business intelligence investment starts with speed to implementation. If you answer yes to any of the following questions, your BI system is not moving as fast as it could be:

- Does your business intelligence solution require weeks or months to deploy or change?
- Does your BI solution require weeks of training before new users can build and publish their first dashboard or report?

Installation and deployment should take only hours or days to implement, not weeks or months. The solution should be simple and intuitive enough for anyone without special coding skills to use; training should be even faster.



Speed at Every Stage of the Data Workflow. Compared to traditional business intelligence, rapid-fire analytics is 10 to 100 times faster at every step in the data workflow, from installing software and accessing data to analyzing complex information, publishing interactive dashboards, and sharing across your organization.

“Uncovering trends easily, things that used to take us hours, now often take us mere seconds... we’re uncovering new ideas all of the time about how we might do things better.”

—Bridgett Milner,
Associate Director in IU’s
office of enrollment



► *Watch and learn how universities big and small are using data faster to improve student success.*

Secondly, the speed to which educators and administrators can access their data is mission-critical.

Users must be able to easily combine many data sets from different parts of the educational operation on the fly. The infrastructure must provide in-memory capabilities to speed up slow data and be able to connect live to fast databases.

Enrollment and recruiting officers from Indiana University (IU), a big Midwestern university, are no strangers to this new, faster methodology. At this organization, technology and education go hand-in-hand, along with mountains of student data.

With thousands of recruits each year, applications, surveys, and test scores add up to a lot of data and many questions that need fast answers.

“My job is monitoring and, ultimately, proposing courses of action to help IU become a more amazing place. Ideally we’re recruiting and enrolling a great class that then graduates,” said Bridgett Milner, senior associate director in IU’s office of enrollment management.

“Uncovering trends easily, things that used to take us hours, now often take us mere seconds. I attend weekly meetings with our leadership team; having a tool where we can easily break things a part when we’re making decisions is powerful. We’re uncovering new ideas all of the time about how we might do things better,” she said.

“The ability to access key information anywhere in a secure format has been a huge value component for us. Our dean can be across the world in Asia and be able to get a quick financial summary or understand at any time what our current numbers are in faculty, staff and students.”

—Ted Curran, executive director of finance at Carnegie Mellon University.

3. Flexible & Secure Configurations

Start small, scale big. Whether you need answers from one database, or insights from data living in multiple data sources, the solution needs to support all stages and phases of growth—it also needs to have a flexible and secure configuration.

During your foundation phase, you’ll start to build the processes, organizational structures and technical infrastructures to support scalability and broad adoption without sacrificing data quality. Data governance is not just about security; it is also about making sure data is accurate, available, and audited:

- **Accurate:** Any analysis and visualization is meaningless unless users can be sure they have the latest versions of data drawn from approved sources.
- **Available:** This is a complex subject. While the analyst may have access to all the data available, there are often viewers of the analysis who only have access to top-level views but not necessarily the underlying data.
- **Audited:** Most organizational data, especially at universities, has some level of confidentiality. And it is important, and often legally required, to keep a full record of who has had access to data and at what level.

Among the top business schools, the Tepper School of Business at Carnegie Mellon University focuses on management science, decision-making based on quantitative models, and an analytical approach to problem solving.

“As a finance and business operations leader, being able to see quickly and easily how we’re doing in our academic programs, our administrative programs, and our research centers, and being able to see when things aren’t aligned with plans is critical. One of my primary roles is to steward the finances of the school and ensure that we are able to sustain ourselves over time, and continue to be a world-class business school,” said Ted Curran, executive director of finance at Carnegie Mellon University.

Tepper School of Business’ self-service analytics deployment started with a strategic vision from the school’s dean, with goals of international expansion, increased visibility, and cross-campus collaboration. Keeping student privacy top of mind, the school was able to perform rapid prototyping in a short two-week period, bringing together key information from multiple data sources into dashboards that the dean himself could use.



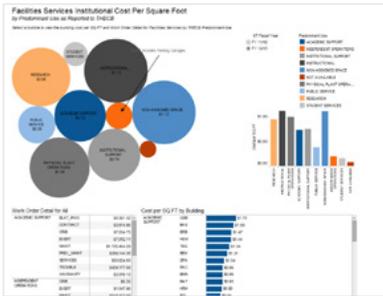
► *Watch this video to learn more about how Carnegie Mellon University uses a flexible and secure configuration for its data analysis deployment.*

“The ability to access key information anywhere in a secure format has been a huge value component for us. Our dean can be across the world in Asia and be able to get a quick financial summary or understand at any time what our current numbers are in faculty, staff and students,” he said.

This deployment “put a flashlight onto our data, and helped identify where we were strong, where we were weak, and what kinds of things we are missing in terms of what we’re collecting and capturing. [It] has really helped us make sure that the data in our systems is solid,” Curran said.

This pilot project also proved their concept for operational support. It became the springboard for other colleges and departments on campus, such as the school of engineering and the university’s facilities corps, to immediately latch onto and adopt the new solution.

“We shared the work we were doing so we could have consistency across colleges on the campus for financial data or admissions data, or career center data,” Curran said.



- ▶ *Watch and learn how visual discovery improved facilities operations and minimized IT support at the University of Texas at Austin.*

4. Understanding with Visual Discovery

It may not come as a surprise that the most essential aspect of this methodology is seeing and understanding your data visually.

Your administrators, researchers, and educators are thinking about the questions they need to ask of their data—not about how to use software. Visualizations will unlock the value of raw data into forward-thinking insight and action. A visual approach to analytics will allow anyone with no special coding skills to instantly spot outliers and trends without sorting through pages of spreadsheets. By using dashboards, a story unfolds within an interactive, visual environment.

The University of Texas at Austin, a large university with more than 52,000 students, 11,000 faculty and staff, operates and maintains more than 20 million square feet of campus property and facilities.

The university operations department is expansive, consisting of many divisions including human resources, utilities, project management, construction services, facilities services and the campus police department. As the campus continues to grow, frequently adding additional buildings, the university operations teams desperately needed to streamline their business processes and performance management reporting to better control facility spending and budgeting in each area.

“When a new building is considered for construction, we have to consider the institutional funding that would go into maintaining that building over so many years,” said Stephanie Dussault, business intelligence manager for the university’s technology resources.

The school knew it needed to transform its reporting system to be able to deliver insight faster. Enter: data visualization.

The University of Texas at Austin found that dashboards with data visualizations were tremendously helpful in pinpointing high-spending buildings, and honing in troublesome outliers across the campus operations.

With visualizations, Dussault said, the operations teams “could see who are the biggest offenders, [and] what are we doing over there that is costing so much?”

The school’s operations effort, the Building Cost Model, gave department workers a ways to determine costs by fiscal year, and costs by work orders.

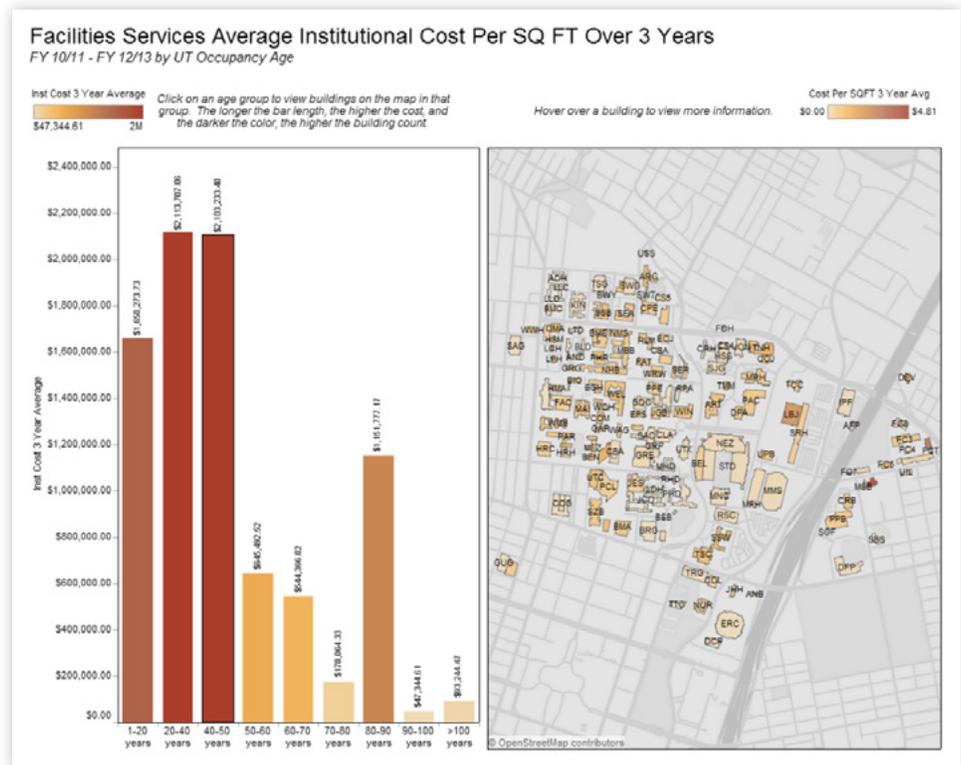
Workers could also drill down to see the details of spending per building, effectively tweak budgets, modify services and improve processes, and ultimately keep their numbers in the black.

“We are quickly able to identify outliers in our data. Interacting with the data made us ask a lot of questions, so we had a lot of work, and it did result in some actionable items... The data visualization transformed the way we are doing things.”

—Ted Curran, executive director of finance at Carnegie Mellon University.

“Our budget has shrunk by 2 percent each year for the past four years, but we have more and more square footage that we’re supporting. And it’s making it harder and harder for facilities to provide the services until we can actually prove how much it costs to operate a building,” she said.

Dashboards that include a detailed map of campus offers the detailed proof they need to make their case for spending and budgeting at each building.



This dashboard is an example of how the operations leaders at UT Austin use data visualization and maps to better see and understand their spending and budget allocation across campus. This interactive dashboard also allows for users to drill down to the underlying data and perform calculations in order to ask and answer any question in real-time.

“We wanted to look at maintenance type by building and see which ones were costing more by square foot. We’ve built in a drill down where we can click to see the detail of why things were costing so much... you can see what [each building] is actually spending on... This gives us a quick and easy way to look at these buildings and see which ones are the highest offenders,” she said.

“Before when we were doing the math, we were trying in our mind to create the picture, to view it. But here in Tableau, it is ahead of you. It’s already in a picture. It’s so far ahead of our old concepts of dashboards.”

—Cindy Sedlacek, Director of Data Administration Reporting, Cornell University

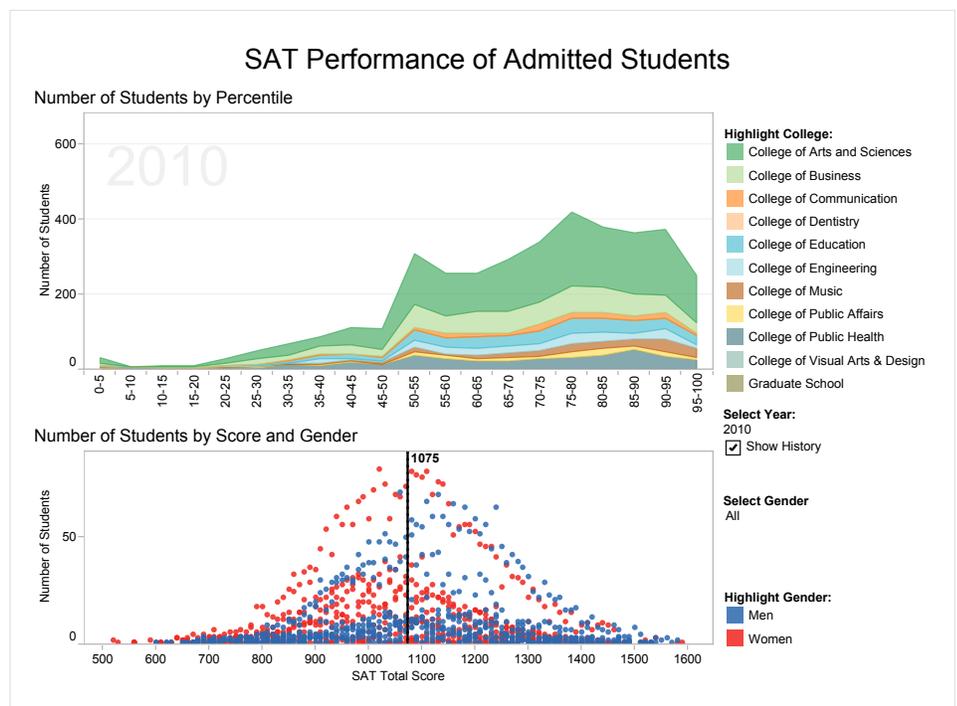


► Watch and learn how Cornell University shifted away from old-school analysis tactics to find better data insights ten times faster with half the staff.

The Bottom Line

There is a tidal change sweeping through universities and places of higher learning. The old business intelligence models are slow and resource-intensive. A faster, smarter implementation of a self-service data visualization tool will improve speed to action across the board.

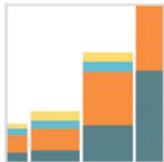
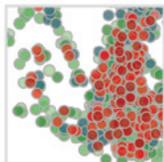
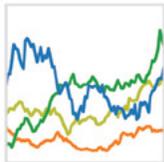
For administrators, today’s insights could influence tomorrow’s financial outcomes. For educators, today’s data could drastically improve graduation rates for their students.



This dashboard explores student performance across year, gender, and College. Deans or department chairs can monitor performance goals to see if the incoming classes are measuring up to university standards.

About Tableau

Tableau offers a revolutionary new approach to self-service data discovery for higher education analytics. With easy-to-use, drag-and-drop technology, you'll quickly connect to, visualize, share, and report on education data, with a seamless experience from the PC to the iPad. With proven deployment methodology, Tableau solutions generate fast, visual, self-service dashboards with no programming skills required. See the impact Tableau can have on your organization by starting a [free trial](#).



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