

# Ten Tips for Using Data and Analytics Effectively in Education

A compilation of best practices from education institutions using SAS® solutions



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# Contributing SAS Customers

This paper was made possible through the contributions and insights of SAS customers working in education organizations. Implementing transformative software solutions in ways that are widely adopted and deliver expected benefits can be challenging. All have extensive experience deploying and using SAS software to turn their scattered data sources into timely, data-informed insights – and they have seen the power of these insights improve performance, student and institutional effectiveness and more.

## Interviews:

### South Carolina Dept. of Education

- Dan Ralyea, Director of the Office of Research and Data Analysis

### University of North Texas

- Jason Simon, PhD, Assistant Vice President for Data Analytics and Institutional Research

### University of Central Florida

- Linda Sullivan, EdD, Assistant Vice President for Institutional Knowledge Management

### University of Idaho

- Dale Pietrzak, EdD, Director of Institutional Effectiveness and Accreditation

### University of Alabama

- Lorne Kuffel, Executive Director of Institutional Research and Assessment

## SAS papers and articles with customers:

- [The University of Alabama makes better decisions through education analytics](#)
- [Use of data visualization and analytics in education is growing: Best practices from education institutions using SAS® solutions](#)
- [Best practices to ensure a successful reporting and education analytics initiative: Key lessons from higher education and K-12 institutions](#)
- [Tips for making the most of your analytics software: Education institutions share their recommendations](#)
- [Use education dashboards to publicize the value of analytics: Best practices from education institutions using data visualizations and analytics to create education dashboards](#)

## SAS customer success stories

- [University of North Texas](#)
- [Winston-Salem/Forsyth County Schools](#)
- [South Carolina Department of Education](#)
- [Sinclair Community College](#)
- [Valencia College](#)
- [Des Moines Area Community College](#)
- [Western Kentucky University](#)

## SAS Customer Videos:

- [University of North Texas: Establishing a Culture of Analytics](#)
- [University of Idaho: The Impact of Data Governance and Analytics](#)

## Innovative Education Leaders are Transforming Their Organizations With Data and Analytics

Across the United States, school districts and institutions are shifting away from using text and tables to deliver information, replacing them with data visualizations and advanced analytics that enable users to visually explore and even predict the future using data. What's driving this trend? And what does it mean for your organization?

Innovators in education understand that when people can access accurate data and sophisticated reporting tools, they can generate trusted knowledge and insights to help transform programs, curriculums and student outcomes – and achieve desired results faster. This is critical today, as noted by Jason Simon, Assistant Vice President for Data Analytics and Institutional Research at the University of North Texas. “You look at the prevalence of debt right now, the expectations of our employers, and at how legislative expectations are increasing for institutions of higher education, and it's clear we can no longer do what we've always done and expect different results... I believe you're seeing a slow yet steady recognition that data, analytics, data management and data governance are going to be key building blocks for making educational institutions successful.”

With advanced analytics such as data mining, statistical analysis, forecasting, text analytics, and optimization and simulation – combined with interactive, self-service analytic visualizations and ad hoc visual data discovery and exploration tools – there are no limits to the insights your stakeholders can generate. For example, by analyzing students' progress during the semester, student advisers can intervene with proactive outreach to underperforming students before it's too late. Similarly, when administrators use predictive analytics to conduct what-if scenarios, they can anticipate the full impact of different decisions, make the best choice and drive better outcomes. Analytics can even provide answers to big questions about things that people may not have looked at before.

But to realize the benefits of data and analytics in education, you need software that supports four essential activities:

- **Data governance.** In order to ensure data consistency and quality over time, establish a governance process for data validation and cleansing to help your organization achieve transparency and trust in the data for the long term.
- **Data management.** With a comprehensive management solution that supports analytics and decision management, your organization can transform, integrate, govern and secure data while improving its overall quality and reliability.
- **Data visualization.** Intuitive, interactive dashboards empower users to visually interact with data; answer questions quickly; make more accurate, data-informed decisions; and share their findings with others.

- **Advanced analytics.** As use of data and analytics increases, users tend to ask more sophisticated questions. And this usually means doing more than just reacting to data in hindsight; it requires using advanced analytics to empower leaders to become predictive, proactive, data-informed decision makers. For example, using predictive analytics, you can determine which students are at risk of failing or dropping out of school. Using this information, you can proactively take steps to retain those at-risk students.

But getting started – and continuously evolving your analytic and reporting capabilities – can be hard. That’s why we’re sharing the top 10 tips shared by SAS customers. Each illustrates how our education customers are overcoming challenges and realizing significant value from SAS solutions. They speak with the voice of experience – and offer time-tested insights that can help you streamline and accelerate the evolution of your reporting and analytic capabilities – and maximize return on investment now and in the future.

## Customer-Proven Best Practices at a Glance

### Tip 1: Secure Strong Executive Sponsorship

To have a successful data and analytics initiative, you need more than just executive approval of budget to purchase software. You also need executive sponsorship at the highest level – someone who fully understands the value that data and analytics can bring to their district or institution and has a vision for using it to transform school, program and student outcomes for the better.

*“You need an executive champion. And I would argue that if it’s not your chief executive officer – or at minimum, one level right below – then your analytics effort is probably going to fail right from the start. So I would want to see clear support from a chief executive who will issue the charge and be willing to open up the pocketbook to make the investment.”*

**Jason Simon**, Assistant Vice President for Data Analytics and Institutional Research at the University of North Texas

Effective executive sponsors are also fully engaged, accessible and committed to breaking down barriers and building momentum for the growing use of data and analytics by staff members at all levels. They can do this by:

- Creating a vision around a student-centered, data-informed culture with increased accountability.
- Helping to eliminate “data jails” within departments by sharing a vision, addressing concerns about losing control of protected data, securing buy-in from colleagues to share data and navigating political issues that can quickly derail a project.
- Determining what data will be publicly available and what data must be internal, protected and secured.

“Secure executive leadership for data and analytical initiatives from the president and vice presidents all the way down to midlevel managers. They can talk to employees about the need for using data for decision making and model how to use analytics in meetings and other contexts.... Non-data people are often intimidated by working with data and analytical reports themselves, which can hinder adoption.”

**Karl Konsdorf**, Director of Research, Analytics and Reporting, Sinclair Community College

Executive sponsor engagement should also include:

- **Regularly attending key meetings** about data requirements and desired metrics to learn how a district, college or department plans to use data and analytics. Attendance at these meetings communicates that these initiatives are important and are a high priority to senior management.
- **Reiterating their vision and promoting the value of data and analytics broadly, regularly and in a positive manner.** It’s vital to build awareness that the use of data and analytics is to accurately assess the current state – without judgment – and collaborate on how to improve the current state. The message is, “This is not about making you look bad, or finding ‘gotchas.’ We are about understanding reality, so we can make it better.”
- **Leading by example and encouraging the use of data and analytics.** Executive sponsors can model the power of analytical insight by bringing reports to meetings, making decisions based on hard numbers rather than educated guesses and more. The goal is to show that, “I buy into this – and I expect you to do the same.”

## Tip 2: Build Strong Collaborative Relationships

Investing in collaborative relationships is critical to success; failing to do so can result in projects that devolve into turf wars – or worse, never get off the ground. As a general rule, the earlier the collaboration, the better you can fully understand the needs of the department and its users, define detailed requirements to drive investments and selections, and secure the buy-in needed to drive successful adoption.

“I cannot underscore the value of investing in relationships enough. At the end of the day, analytics is a team sport, so to succeed, you need to have the emotional intelligence to build bridges, demonstrate value, anticipate challenges and identify what makes your institution’s culture tick so that you can find collaborative strategies that work. For example, we are engaging over 35 technical and functional subject matter experts across admissions, financial aid, enrollment management, business and finance, the budget office. And we’re building a reputation for ourselves as collaborators across campus. Because part of the vision that that I’ve passed to our analytics team is that analytics should never be thrust upon someone. It should be developed in a way that it doesn’t feel like it’s something being done to them, but rather, it’s happening together with them so that they can see the end goals for themselves.”

**Jason Simon**, Assistant Vice President for Data Analytics and Institutional Research at the University of North Texas

### Tip 3: Data Governance and Data Management Are Critical

Most likely, your institution has data that's scattered across fragmented systems in different schools, departments and campuses in various formats and a multitude of systems; this can result in data overlaps, gaps and inconsistencies that lead to questionable analytic results. So it's critical that you carefully determine the best sources to integrate within your data warehouse. Expect some heated debates, as data owners will have reasons why their data should be declared the official data.

To ensure that data is interpreted the same way by all stakeholders, develop data definitions as part of a data dictionary. And to ensure data consistency and quality over time, establish a governance process for data validation and cleansing before it's loaded into the data warehouse. Data governance encompasses the people, processes and technology required to create a consistent enterprise view of an organization's data. It formalizes the process of managing information across an organization through business processes and policies designed to ensure that data is handled in a prescribed fashion, with human intervention handled by trained data stewards. By concentrating on the health of your data, you can create better data to support core strategies and initiatives – and accurate, trusted analytic results.

*"I'd say the biggest best practice ... is making sure you have a strong data governance model in place. In our case, it came from the top down: Anything that goes out of the institution must be vetted with our office. We have to be able to say 'this makes sense' so that there's uniformity in the definitions used by everyone and the data consumed is consistent across all kinds of public dialogs and internal decision-making processes. This kind of baseline data governance specifies who's in charge of what definitions and how it works. It's really critical."*

**Dale Pietrzak**, Director of Institutional Effectiveness and Accreditation at the University of Idaho

*"For our team to be able to exploit the business data network, we needed to have the right data governance application and tools in place. This enabled us to literally begin to track how business terms moved in, through and out of our data management practice. This transparency was the real difference maker. Because now we had a trusted source of truth around our information that allowed our executives to cut through some of their concerns and focus on making real business impacts – not just engage in in dialogue around what something might 'mean.'"*

**Jason Simon**, Assistant Vice President for Data Analytics and Institutional Research at the University of North Texas



## Tip 4: Manage Expectations Proactively

It's not uncommon for stakeholders to view reporting and education analytics software as all-powerful magic; they can ask for anything and instantly get whatever they want, however they want it. But in reality, fast, effective reporting and analytics require significant prework and careful investment, especially in the areas of data preparation, integration and planning.

So when engaging with stakeholders – especially upper-level managers – listen actively to their wish lists, help them prioritize what's most important to them and say “no” when you have to. Focus on what's achievable now – and save the rest for mid- and long-range plans. By being open and honest about what you can deliver (and when), you can help people have realistic expectations (the key to having happy customers) and build their trust.

Setting clear expectations is particularly important when working with upper-level managers, such as the board of regents (higher education) and superintendents (K-12), as they will expect certain things to be shown in reports from day one. The message to convey to them is, “We hear you. We will be able to deliver core analytics first - not the kitchen sink. If we can give you everything you want from day one, we will. If we can't, we will focus on the most important metrics first and we'll add on more later.”

“Our executives now understand that we're not going to rush an analytic product into production without first making sure we do due diligence on the data management and data governance side. Our executives are showing patience with us because we have helped them understand the strategic value of a strong data management approach. And we're not going to rush in this work. Because the consequences of rushing could destabilize the potential positive outcome. We'd rather get it right and do it right, making sure along the way that we're building trust and confidence across our institution. This outcome is the hallmark for success for us.”

**Jason Simon**, Assistant Vice President for Data Analytics and Institutional Research at the University of North Texas

## Tip 5: Determine the Best Way to Process and Deliver Each Report

It's vital that you identify and engage key stakeholders – including end users – early in the analytics planning process to understand their unique needs and requirements. The best way to do this is by performing a detailed audience analysis, which involves asking users about the types of questions they want to answer using analytics, the kinds of reports they need given their roles, the level of detail they prefer and more.

Enabled with rich insights into stakeholder requirements, you can develop an optimal reporting and analytics solution that meets their unique needs and ensure the reports they generate more valuable and usable. At the same time, you empower stakeholders to uncover new and deeper questions that can be answered using analytics.

“I think the best practice is to engage your stakeholders in making meaning of the data that they are sharing with you. Be very clear about the implications of the data they share and how you're going to use it to support decisions and judgments.”

**Dan Ralyea**, Director of the Office of Research and Data Analysis,  
South Carolina Department of Education

As part of this process, explore the following:

- **User types and expectations:** For example, the president of a university or the superintendent of a K-12 district might need a high-level visual dashboard of key metrics where they can drill into the data to learn more. A dean of a college or a principal of a school might need to see what is relevant to their area and visualize data to understand more about the students. And professors and teachers might need to see select information relevant to their courses and individual students.

“Different audiences need different types of reports and analytics. For example, our executive team is interested in revenue, enrollment and strategic planning data for the university as a whole. They need high-level, high-impact reports that tell a story. The deans and department heads, on the other hand, are interested in the students in their college and department and what's going on with them. So they need a mix of high-level, high-impact and detailed reports on students. And advisors are interested in who is at risk. They need detailed contact information and risk models of student data so they can intervene when necessary.”

**Tuesdi Helbig**, Director of Institutional Research, Western Kentucky University

- **Formatting and reporting priorities:** When designing reports, present data using an easy-to-use, easy-to-understand format. As a general rule, include the top 10 most important items for the target audience first and subsequent data (based on priority) in categorized layers within the report.

“A best practice that we’ve found is the need for simplicity in our reports, analytics and visualizations. This means reports need to be easily understood and have the proper titles, labeling and footnoting. In addition, we always make sure that we involve the user in the development of our analytics requests.”

**Linda Sullivan**, Assistant Vice President for Institutional Knowledge Management, University of Central Florida

- **Access control requirements:** Stakeholders should only be able to see what is relevant to them. So be sure to use software that supports granular, highly secure access controls.

“Our administrators, principals and school counselors need detailed information on students to perform their jobs. Because we have reliable data – and users can ask questions and get answers – we have one of the most intensely data-driven school districts in our state. And that’s something we’re very proud of.”

**Debbie Harman**, Director of Enterprise Data Systems, Winston-Salem/Forsyth County Schools

Implementing a flexible data visualization and analytics solution – one that can meet a wide range of user needs and expectations now and as needs changes – can help you meet these requirements. SAS Visual Analytics, for example, provides an interactive user experience that combines advanced data visualization, an easy-to-use interface and powerful in-memory technology. It also allows a wide variety of users to visually explore data, execute analytics and understand what data means. Then they can create and deliver reports wherever needed via the web, mobile devices or Microsoft Office applications.

## Tip 6: Provide Easy-to-Use Data Visualization Tools

Data visualization tools bridge the gap between your stored data and the people who need it to make fast, data-informed decisions. They simplify the complexities of working with massive data sets, making it easy to move from data to instant insight.

“The data has to be presented in an easily consumable format. Don’t create just charts and graphs or tables of numbers – create something that’s meaningful, targeted, and users can connect with. Make sure that the visualizations are connectable as well as actionable so users know what to do with it.”

**Karl Konsdorf**, Director of Research, Analytics and Reporting, Sinclair Community College

First, data visualization tools eliminate the need for the back-and-forth conversation between users and IT (which often leads to misunderstandings and costly overhead) and wasted hours waiting for each iteration of analysis and reporting. To be effective, people need answers fast enough to efficiently explore a problem at the speed of human thought; this requires being able to run through multiple analytic iterations quickly and easily.

Second, data visualization tools allow users to explore all relevant data with ease. For example, they can slice and dice data, look at more options, uncover hidden opportunities, identify key relationships and make more precise decisions faster than ever before. In addition, they can perform interactive, ad hoc visual data discovery, exploration and visualization for lightning-fast insights.

“Administrators can go into a report and select different things – for example, enrollment data or faculty numbers over time – and then make a selection to see what the data looks like by college, race, sex or other demographics. And just like that, they can dynamically see the results. The reports are beneficial to our administrators because they now have the ability to evaluate a lot of 'what if' situations. We've been able to give them the ability to dive down into the data, and they can actually see what’s happening and spot patterns with students. They can examine the credits they’ve earned in a certain time period, what their GPAs are in their first semester, and more. And if they want to throw in some other parameters, they can add them to the report fairly easily. The result is a dynamic presentation as opposed to just a table or graph.”

**Lorne Kuffel**, Executive Director of Institutional Research and Assessment, University of Alabama

SAS Visual Analytics, for example, supports end users and IT on both these fronts. For end users, it provides an interface specifically designed for nonprogrammers. They can easily create hierarchies on the fly (e.g., year, semester, month, day, department and faculty) and simply drag and drop the variables they want to explore to uncover trends and correlations. In addition, SAS Visual Analytics provides powerful predictive analytic and visual data exploration functionality, enabling users on any web interface to easily process data using in-memory computing. They can quickly design reports that are attractive, interactive and meaningful, and then easily distribute them via the web, Microsoft applications or mobile devices. They can even create reports that enable recipients to explore data, slicing and dicing the information using filters and drill-through capabilities.

“Our institution determined through the president and provost that our office is going to be what they called ‘the one truth.’ This meant that we had to be able to provide to the institution a set of standardized data sets – and visualizations of those data sets – for a wide array of users. Some would be relatively unsophisticated users of statistical processes, and others would be somewhat more advanced. For us, the data visualization functions of SAS Visual Analytics, in particular, are a really helpful way to empower users who are not as knowledgeable about statistical things.”

**Dale Pietrzak**, Director of Institutional Effectiveness and Accreditation at the University of Idaho.

## Tip 7: Collect User Feedback Continuously, and Act on It

Immediately after the launch of dashboards, start gathering feedback from users about how they are using the system and ways you can improve it. For example, you'll want to find out if you are delivering what people want, how reports and interfaces could be improved, and what's not proven useful to them.

Constructive feedback can help you refine offerings and services, prioritize investments, and validate what's working and for whom. Many SAS customers, for example, have learned that their end users love how SAS Visual Analytics enables them to quickly and easily visualize data however they want to – and in an easily consumable and meaningful way. Top executives have reported how they love the ability to view dashboards on their mobile device; whether they are sitting in a conference or a Board of Regents meeting, they can use dashboards to answer complex questions, prove points and negotiate more effectively. User feedback like this helps you understand what works, what doesn't, and what kinds of features to look for in new analytic and reporting solutions.

*“By using SAS Visual Analytics, administrators can view the information themselves anytime, anywhere, giving what one campus president described as ‘the ability to see what is going on from my mobile device while I’m sitting in the drive-through at McDonald’s.’”*

**Daryl Davis**, Director of Institutional Research, Valencia College

You can collect user feedback through many channels. Some SAS education customers organize regular sessions with all types of stakeholders where they record all the comments and suggestions, prioritize recommendations and implement them where possible. It's also beneficial to meet with stakeholders regularly to discuss data and reports in detail. For example, you may find that the reports you are providing are too high-level; users may need to be able to drill down into detail, such as profiles for individual students. In addition, consider tracking report usage to understand key users and the top reports accessed in the dashboard.

All of these feedback mechanisms allow you to capture valuable information and act on it, which results in happy users. Before releasing updates, consider creating a template of new and improved reports so users can validate that the changes meet their expectations.

## Tip 8: Empower Users With Training and Self-Help Materials

Many education professionals are not savvy about data or analytics. They need help learning how to understand data and interpret analytical reports correctly before they can make informed decisions. So invest in user training and self-help resources. Some institutions use a train-the-trainer approach, identifying key stakeholders whom they can educate and turn into effective, confident data consumers and peer teachers. Others provide hands-on user workshops in computer labs or take advantage of training provided by software vendors. For instance, SAS provides free training “how to” videos, tutorials and demos to learn tips and tricks for working with SAS software. Regardless of the type of training used, complement it with additional self-help materials, such as online videos, user manuals and data dictionaries that define value hierarchies, data elements and more. These materials can be offered in hard copy or through context-sensitive online documentation.

So to quickly realize its full value, develop in-house expertise through two channels. During development, use SAS Consulting® for expert, on-site assistance and knowledge transfer. Then take the next step by taking advantage of SAS’ online courses, training classes, software manuals and programming guides. SAS has resources for everyone, from beginner to advanced software users.

“To ensure adoption, we do bimonthly training sessions through our Center for Teaching and Learning. We rotate between the tools every month. We also have an annual data summit, where we invite the college to come to our conference center, including all of the vice presidents, deans, directors, managers and some faculty. I think we had about a third of all of the full-time employees of the college attend this two- or three-day event on data and how we are using analytics. We also showcased a lot of our new tools and capabilities. People are excited about it.”

**Karl Konsdorf**, Director of Research, Analytics and Reporting, Sinclair Community College

## Tip 9: Publicize the System

To build your user community, look for opportunities to discuss education dashboards with colleagues, explaining how they provide valuable insights and answer complex questions that couldn't be answered previously. Share success stories about how colleagues in other departments, schools or classrooms have used data and analytics to improve performance and student outcomes. (For example, explore the public dashboards shared in the next section.)

The goal of promotion is to educate and generate excitement about what's possible so that your entire district or institution can become more data-informed. As more people learn about the data, analytics and visualization capabilities of your institution, you'll see increased demand.

“Our administrators are empowered to go in and play with the data themselves. It's helpful and really quite powerful information for people who are trying to plan how best to implement different policies for the university. Right now, we have a handful of administrators in academic affairs, student affairs and the president's office who use the SAS Visual Analytics reports we've developed. But that number will grow, as will the analysis we conduct.”

**Lorne Kuffel**, Executive Director of Institutional Research and Assessment,  
University of Alabama



## Tip 10: Plan Ahead to Meet Evolving User Needs

As users become experienced data consumers, they start asking more sophisticated questions. To ensure they get the answers they need, you'll need to offer more data, more detailed reports, more sophisticated and advanced analytics, and enhanced visualization capabilities.

"People used to ask simple questions, such as how many students of a certain type are enrolled. But now they're asking us more sophisticated questions like, 'Are we driving majors off by requiring certain courses early in their major?' or 'Are there certain courses in our major that correlate with students changing their major or leaving the university?'"

**Tuesdi Helbig**, Director of Institutional Research, Western Kentucky University

"As the users become more sophisticated and use the data, their experience generates more questions. And so now we're being asked to look at more sophisticated things. As a result, we are on that trend of moving away from being a reporting department to a true research and analytic department."

**Karl Konsdorf**, the Director of Research, Analytics and Reporting, Sinclair Community College

Because user needs will evolve over time – and numbers of users will likely increase – plan ahead when building out your data and analytics solution. Make sure you invest in software that can be upgraded, expanded and can scale as user needs evolve. And consider cloud options or investing in a server (or servers) that can support a larger user group than your initial deployment.

## Best Practices in Action

As you envision your next reporting and analytics solution, what do you see? One way of envisioning how your education dashboard could change over time is to look at the [publicly available customer sites](#) of other institutions reflecting various levels of analytic maturity. You'll see first-hand the power of SAS solutions at work – and leave with inspiration and ideas to address your own reporting and analytics needs.

## Learn More

With the real-world insights and proven best practices shared in this document, you have a wealth of knowledge about how to evolve your reporting and analytic capabilities – and make the most of your SAS software investments. To learn more, we encourage you to explore the SAS papers and videos developed for higher education and K-12 customers mentioned in the “Contributing SAS Customers” section of this paper, or visit us online at [sas.com/education](http://sas.com/education).

## SAS and Education

SAS solutions are licensed and implemented at more than 3,000 educational institutions worldwide. SAS has more than four decades of experience working with education institutions. SAS solutions are used at more than 83,000 business, government and university sites in 146 countries – including 92 of the top 100 companies on the 2018 Fortune 1000®.

## About SAS

Through innovative software and services, SAS empowers and inspires customers around the world to transform data into intelligence. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®.

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