2023 DEVELOPING DATA ANALYTICS CAPABILITIES CONFERENCE PROCEEDINGS

Georgia Data Innovation Hub
Carl Vinson Institute of Government
UNIVERSITY OF GEORGIA

1785

Dear reader,

Data are critical to helping state and local leaders make wise and strategic decisions. Agencies have terabytes of data but often don't know how to use their data effectively. Most state agencies, local governments, and school systems cannot afford the in-house talent and infrastructure to apply cutting-edge approaches to their data and decision processes.

The University of Georgia Carl Vinson Institute of Government created the Georgia Data Innovation Hub in 2022 with the goal of developing a community of data users from across all levels of government in Georgia and making the space for learning to increase the capabilities of governments in their data analytics journeys. This first conference met that goal. The conference counted 200 registrants from 70 different organizations from all sectors and policy areas in government, including k-12 education, higher education, state agencies, court systems, cities and counties, and regional commissions.

This report summarizes the learnings from the conference and is a resource for both attendees and others interested in the work of the Georgia Data Innovation Hub.

To keep up to date on all Georgia Data Innovation Hub content, please visit https://cviog.uga.edu/training-and-education/georgia-data-innovation-hub/

I want to thank all attendees, presenters, and sponsors who made this conference a success.

Anna Wrigley Miller
Georgia Data Innovation Hub Lead

WELCOME

Rob Gordon, Director, Carl Vinson Institute of Government, University of Georgia

I'm glad you're here at our first annual Data Analytics Conference. I would like to say, on behalf of all of us at UGA Carl Vinson Institute of Government, welcome. Welcome to this conference, and welcome to the University of Georgia. Many of you are from other states, and we have a number of other universities represented. I'm pleased that you're here. As director of the Carl Vinson Institute of Government, I have the honor of serving alongside a team of experts who every day inform, inspire, and innovate so that governments large and small can be more efficient and responsive to citizens, can address not only current but emerging challenges, and serve the public with excellence. We are all committed to promoting excellence in government, whether that's through technical assistance, training programs, applied research, technology solutions, or conferences like this one. In doing so, we work extensively with governments across Georgia and beyond to develop the knowledge and skills elected officials, their professional staff, appointed board members, and others need to manage effectively in the 21st century.

Of course, we are very proud to be an integral part of the University of Georgia's Land and Sea Grant Public Service and Outreach mission. The core goal of the Institute of Government is to be a trusted resource that our government leaders can turn to for the highest quality educational programming, data-driven research, and technical assistance designed to inform government leaders' decision-making so that they can determine how to best deliver services to the citizens they represent. We in this room know that data and the ability of our governments to use their data effectively are critical to helping state and local government leaders make wise and strategic decisions. Through our Georgia Data Innovation Hub, we believe the Institute of Government is uniquely positioned and expertly qualified to be the convener, trainer, and technical assistance provider, all of which raise the government's capabilities in data analytics, visualization, predictive analysis, and other data work.

We are pleased to have nearly 200 participants with us today. You represent over 70 different organizations from all sectors and policy areas of government, along with industry leaders who work closely with you. Over the course of this conference, our panelists and speakers will share insights into how they work with data to best inform key decision-makers in our state and how data science and analytics can aid governments in serving the public. By participating in this conference, you are leading the way for a community of people working with data across the public sector. Please take this opportunity to meet new friends, reacquaint yourself with old friends, and learn from one another. We hope this conference creates a forum to learn best practices, develop new skills, and build lasting connections across our great state.

ARE YOU READY? ASSESSING THE DATA MATURITY OF YOUR ORGANIZATION

SPEAKER

Dr. Andy Clark, Industry Executive Director for Public Sector and Higher Education, Oracle

Computing is evolving fast. In 1999, the computers used in college computing courses were about 1,000 times less powerful than the phones we carry today. The pace of change has only accelerated, but the ability of public sector entities is slow to respond to change. The public sector has constraints on infrastructure, enterprise systems, and data structures that they need to consider when attempting to keep up with that change. It is important to assess where each entity is on the pace of change continuum.

Dr. Clark has more than 25 years of experience in leadership, research, student lifecycle management, and analytics. He has leadership experience in institutional research, enrollment management, strategic organizational design, and change management at five universities. He presented how to assess the data maturity of public sector organizations.

Valdosta State University Case Study

In 2011, Valdosta State University (VSU) enrolled the largest first-year class but only had a 65 percent retention rate, which means 850-plus students who enrolled as first-year students did not enroll again. About $12.5 million worth of revenue went with them. VSU had to rethink how it used data to address the low retention rate.

First, they built a **data warehouse** to ingest more information as the school grew in its data maturity journey. Then they began focusing on student success. The goal was eventually leveraging **predictive modeling** forecasting to drive decisions around the campus and determine how and where the school should invest.

VSU focused on its **Business Intelligence**, or its ability to convert all its capabilities into knowledge. This journey began with dashboards to show faculty members and the provost which programs were performing well and which ones needed help. The English faculty dashboard is an example. A roster of students is across the bottom of the dashboard, which includes charts such as racial or gender breakdown of the courses. Predictive modeling came into play with the at-risk student charts. The dashboards allowed students, faculty, and advisors to address challenges in a proactive and actionable way.

The data warehouse VSU developed was built in a non-constraining way to answer more questions. Less structured data can provide additional insights into models you may want to build or run.

Once VSU set up its data warehouse, it could answer more questions. One of the sillier questions they asked was whether students who ate breakfast retained information better than those who didn't. They brought data together from the student system, the Human Resource system, and the students' swipe card data. VSU found a statistically significant result. Students who ate breakfast were more likely to re-enroll than students who did not eat breakfast. Eating breakfast is not the likely cause of the retention; it is more likely behavioral. Students who are up in the morning before their classes start are more likely to go to class than those who sleep in. Data tells you one thing, but context is critical in data science and the interpretation of data.

Another area VSU focused on students' math class placements. Course pass rates indicated that VSU's current placement methods for math students was not leading to student success. They changed the model they used to place students into math class, and pass rates in math improved significantly. However, in college algebra, the lowest level math, scores were still poor. They analyzed college algebra students and saw three types of students entering that course. One group passed the 50-minute course offered three days a week with no problems, a second group needed additional tutoring in the lab. The third group had a 47 percent passing rate and needed a different intervention.

To address these issues, they used the ALEKS[1] math assessment and built into their model an option for students who score high enough on the ALEKS exam to take a higher-level math class. For the group of students who had a 47 percent pass rate, they changed the course structure to five days a week and were able to raise the pass rate to 70 percent. In the same year, they lowered the number of students who were losing financial aid because of standards of academic progress. Students must pass a certain number of their courses to maintain federal aid eligibility. For many students, if they lose federal aid eligibility, they can't finish college. As a result of the project, VSU reduced the number of students losing financial aid by 80 percent.

VSU used data to become **analytics-driven**. This is one example of how data analytics were used to improve student academic programs. Like VSU, governments can use their data and models to make better informed decisions that improve outcomes and maximize funding.

---

1. ALEKS is an online tutoring and assessment program.

WHAT EXECUTIVES NEED FROM DATA ANALYSIS

SPEAKERS

Jessica Simmons, Deputy Chief Information Officer for Broadband and Special Projects, Georgia Technology Authority

Peggy Merriss, Executive Director, Georgia City-County Management Association

Michael Nail, Commissioner, Department of Community Supervision

Caitlin Dooley, Executive Director, Voices for Georgia's Children

Data is not compelling on its own. It is a tool to tell a better story about how our world works and inform our next steps. Decision-makers use data to inform their budget processes, the policy priorities of their organizations, or where to best place their resources, so analysts must deliver data to them in a way that best aids in their decisions.

The conference's morning session featured a panel discussion on what executives need from data analysis with Jessica Simmons from the Georgia Technology Authority, Peggy Merriss from the Georgia City-County Management Association, Dr. Caitlin Dooley from Voices for Georgia's Children, and Michael Nail from the Department of Community Supervision.

This panel was designed to learn what executive leadership in government agencies need from their data analysts. Panelists showed examples of effective visualizations and shared how they develop data-driven teams.

What executives need from their data analysts to improve decision-making

Decision-makers in government often wear multiple hats or are elected officials who serve in a volunteer capacity. Therefore, decision-makers' time is limited. Panelists stressed the importance of keeping things simple, clear, and concise for decision-makers.

Simple, clear, and concise does not mean showing a decision maker a graph and asking them to intuit its meaning. Data analysts must come into meetings with **clear** visualizations, **describe** the visualization, and **explain how it can answer their questions.** Peggy Merriss, Executive Director for Georgia City-County Management Association asks analysts, "Tell me what you're going to tell me, show me what you're going to tell me, and tell me again what you're going to tell me." Clarity will ensure accurate interpretations of the data, leading to the best-informed decisions.

Storytelling is a key piece of presenting data to executives. "Paint a picture and tell a story," stated Department of Community Supervision (DCS) Commissioner Michael Nail. Start with the bottom line first and then work backward so the executive knows why this data is critical. However, the story the analyst tells needs to be complete. It should include caveats, context, and perspective to give the executive the best chance at understanding the problem and how to solve it.

Data Visualizations that Work for Executives

Panelists shared effective visualizations that they use to inform policy, budget decisions, and allocation of grants. Visualizations must paint a picture of the current state of affairs and clearly explain what the organization is doing to respond. Michael Nail shared a slide (See Figure 1) that the Department of Community Supervision presented to the state legislature during the budget process. He likes this slide because it has all the key information about the agency's programs and DCS's performance.

Figure 1. Department of Community Supervision Snapshot

Dr. Caitlin Dooley, Executive Director of Voices for Georgia's Children showed the dashboards that are available for the public on the agency's website. Maps are useful to show statewide issues and local differences. Figure 2 is a map that illustrates the certified Child and Adult Food Care Program locations related to population density by census tracts.

Figure 2. Voices for Georgia's Children Dashboard
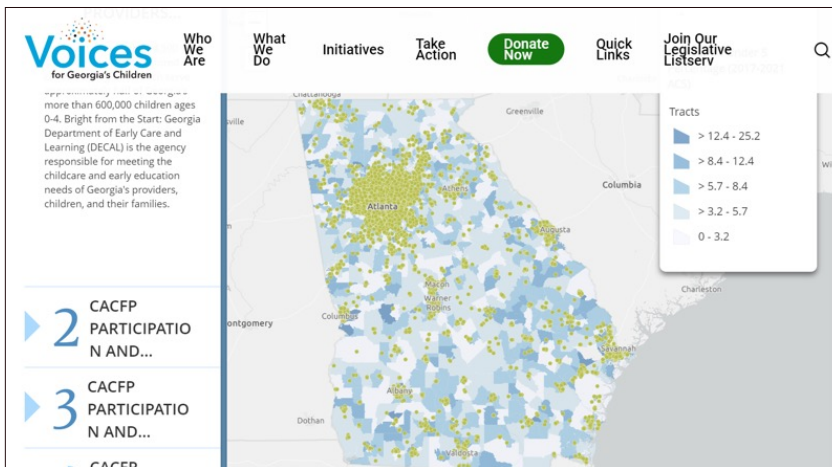
Jessica Simmons, Deputy State Chief Information Officer and Executive Director of the Georgia Broadband Program, showed the state broadband map with current broadband coverage and service areas that will receive grants to inform future funding decisions. These interactive maps have guided over $1 billion in state and federal broadband funding by pinpointing the areas that had gaps in highspeed internet service.

Figure 3. Recent Broadband Funding
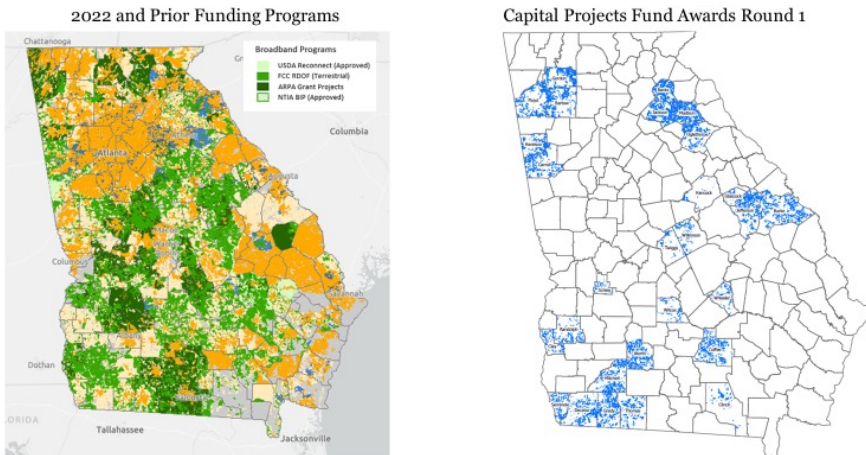
Interactive Dashboards

Interactive dashboards can allow for real-time data use, providing the most up-to-date decision-making information. Jessica Simmons highlighted the Georgia Data Analytics Center's real-time dashboards. She noted, "You know that everything you're looking at is as close to real time as can be versus another resource that used to be the only resource out there." Interactive dashboards give decision-makers a clearer picture of what is currently going on. They have to act as a guide for decision-making. Commissioner Nail remarked, "You can use dashboards not just for the big-picture, but for everything. I look at it like I've got a dashboard in my car." Like a car's dashboard, interactive data dashboards give a real-time look at what is happening in a policy area or organization so that decision-makers can respond accordingly.

Interactive dashboards can be flashy and exciting but must be rooted in achieving your organization's mission. Without that foundation, the dashboards can be more distracting than useful to decision-makers. Dashboards need to be legible for any audience. They have to be easy to read, easy to understand and must keep the audience in mind. Merriss noted that "visualization overload is as bad as visualization nothing." Dooley offered a different perspective, as she likes to play around with detailed dashboards. She noted that **for more complex visualizations, you need a "dashboard navigator" to guide the audience through what they can see and what questions the dashboard answers.**

Developing Analytical Capabilities

Building a good team is critical to developing analytical capabilities. Data analysts create tools that respond to organizational questions. Best practice calls for your team to be in every project meeting so they know what questions the dashboards need

to answer. Every team member must be trained correctly to use and interpret data. Dooley stated, "You're bringing the executives who may be new to the data. You're bringing along the analysts who are very familiar with the data but may be new to the executives' questions. Everyone must understand that you're a team moving on that path together no matter what. A good team will have everyone on the same page about data capabilities."

Pursue best practices. For example, hire forward-thinking individuals who take care of the data and the research. They can anticipate what's around the corner and what your organization needs to do to get to the next stage. Understand current skill sets and potential knowledge gaps within the team and find ways to supplement those. You may need to find a good external partner to support your efforts.

Researching, finding partners, and digging to see what's already out there will also help an organization's data maturity journey. There might be something at the state level already in place that local communities could leverage. Jessica Simmons noted, "Rather than [the community] having to tackle putting together a lot of information or starting at the very beginning of something, there very well might be a resource out there already that can quickly get them the data they need." **Building relationships and connections across the public sector can collectively raise the state's data maturity.**

DEMOCRATIZING DATA: SHARING DATA AND WORKING ACROSS AGENCY BOUNDARIES

SPEAKER

Dr. Nathan Barrett, Vice President for Programs and Development, Coleridge Initiative

Data infrastructure must increase the utility of data and maintain privacy and confidentiality. The Coleridge Initiative attempts to maintain that balance by following the Federal Evidence-Based Policymaking Act of 2018. The Act has three main goals: strengthen privacy protections, improve secure data access, and enhance the government's evidence capacity. These three ideals appear to compete against each other within the same Act, and, different values get promoted over others depending on who is at the table. Sometimes it takes work to strike the right balance.

Dr. Barrett oversees the Applied Data Analytics training program and works with state and federal agencies to develop solutions focused on building large data infrastructure and conducting research for evidence-based policy. Dr. Barrett emphasized the importance of sharing data and working across agency and state boundaries to drive innovation while also focusing on data governance.

States face common challenges and have similar questions about how to use data. Coleridge attempts to help government agencies and states develop data-based insights for policy using **technology**, **collaboration**, and **training**. There is much opportunity to learn from what other states are doing. Cross-state work is essential because policies and finances care about state borders, but people do not. States need to create a cohesive strategy to share knowledge and learn from one another.

Dr. Barrett explained that the Coleridge Initiative emphasizes four components to help government entities share data between federal agencies, state agencies, and local governments to answer policy questions.

1. The **data infrastructure** is first and foremost. You must have a data infrastructure to answer these deeper and more impactful questions.

2. You must have a shared **technology platform**. A third-party host like Coleridge can provide a standard agreement on where data should live when shared across agencies.

3. You must have an **active user community** with a driving business need to share data and solve a common problem. There are plenty of examples of huge initiatives, in which millions upon millions of dollars have been spent to build something that lies dormant. You must have a user community who values and uses data.

4. It all has to be **policy-relevant**. We want to move the needle on things we care about, the people we care about, and the people we serve. Data sharing projects must inform program valuation, policy, or budget decisions.

There is a very real trade-off between utility and risk. Some people value the risk proposition far more than any utility that could come from the agency's data. To shift the curve, we think about the data infrastructure, the platform, the user community, and the questions that drive the policy relevance. Trust is the first step in building the data infrastructure to solve the most complicated policy issues. Coleridge works to create an active and diverse community of users/consumers who want to share data across jurisdictions to provide participants relevant, timely, and actionable data to serve the public interest.

IMPACT UNLEASHED: PRACTICAL EXAMPLES OF USING ENTERPRISE DATA AND ANALYTICS TO MAXIMIZE MISSION IMPACT

PRESENTED BY

Ellen Feehan and **Steve Wheat**, McKinsey and Company

McKinsey works with state and local governments to help deliver impact. Data and analytics are essential to improve meeting the needs of residents, businesses, and the staff who dedicate their lives to the public sector. Organizations have a level of maturity that allows them to move from data to action to impact.

Across the public and private sectors, organizations are at every data maturity level.What elevates an organization from simply being data-driven to using data for insight, is that data is used at all levels in the organization- from senior leadership to the front line. Front-line employees have useful data that can help influence their work and, as a result, change the impact they can have on the people they serve. A holistic enterprise data and analytics strategy should consider six elements:

1. A value-driven roadmap

2. Analytics products

3. Data products and domains

4. Platform and services

5. People and talent

6. Operating model

Organizations must be able to lead with data rooted in the business. The data and analytics function, the IT function, and the program, and the business function must work together. Also, organizations need to build foundational elements and capabilities as they develop an enterprise analytic strategy to develop synergies, demonstrate impact, and get a bit of leverage beyond the immediate business problem.

To become more data mature, organizations must budget to become data analytics organizations. Real resourcing and funding must go toward your data and analytics capabilities. That funding must also go toward on-the-ground training, the governance structure, and bringing people along. When starting on a data and analytics transformation, it must begrounded in the business strategy and the organizational initiatives. Take a top-down approach and map out the different

domains and use cases to deliver impact. Create a domain that is a cluster of interconnected use cases. It will have a business impact and will move the needle quicker because of the interrelated components. This domain will create foundational data products and, beyond that, can have multiple domain and use-case use.

For example, COVID-19 devastated a state in the Northeast. This state had the highest per capita death rate of people in long-term care facilities. The influx of patients quickly overwhlemed the healthcare system's capacity. McKinsey supported a state hospital in creating a data infrastructure system. In a period of days, they could get data from various sources. In a short time, they developed granular disease progression, health system capacity, testing, and ultimately, vaccination and therapeutics data for every subpopulation group they might want to consider. Those data drove their decision-making.

To do this, they set solid targets:

1. How do we preserve lives and livelihoods?

2. How do we make sure that our decisions are data-driven?

3. How do we ensure that those at higher risk are cared for and have equitable access to the latest public health interventions?

Fast forward a year and a half later. They the hospital invested in establishing a centralized data and analytics hub because of this data-driven decision-making and the state's leadership. The data hub didn't exist before COVID-19. Analytics sat within different parts of the organization, so the communicable diseases department did predictive forecasting and surveillance. The logistics team looked at health system capacity. The Vaccine Preventable Disease Program looked at vaccine rates. Before this project, the data was in disparate locations. For an analytically immature organization, one of the better things to do is think about the value of a centralized data and analytics hub, where you can get a group of people who can be the thought leaders and the partners for all the parts of the organization and help de-silo.

To highlight a Georgia example, Feehan and Wheat shared McKinsey's work with the Technical College System of Georgia (TCSG) to create an eCampus system.

TCSG oversees the state's technical colleges, adult education, workforce, and economic development—twenty-two colleges around the state, 345,000 students, and 12,000 faculty. The eCampus initiative intends to make courses from any one college available across the entire system. The initiative can leverage exceptional faculty at individual institutions across the whole system and reduce the time for students to complete programs by making more courses available over any period goal is also to increase enrollment in TCSG institutions.

This process required much integration, including live online data integration between the 22 college systems and a new strategy for reporting and analytics in a unified way across the entire system. TCSG identified a need for a system-wide course catalog to

make the new program work. They needed to cross-list the courses across the student information systems from the 22 colleges and implement a common central digital learning platform for these courses. They also needed to provide a common experience for the students enrolling in these courses and ultimately get student records and grades to their home colleges so students could get credit at their home institutions.

The project was as much a practical cloud infrastructure project as a learning opportunity to upscale the team and build a collaboration.

TCSG decided to replicate the data to the cloud in real time. Moments after a change occurs at each institution, that data has been synchronized to the cloud using AWS DMS. This data migration service not only migrates data but can keep it current and replicate it. Then they created a process to extract the data into initial structures for curation and then extract it further into reporting structures. TCSG now has a real-time analytics platform for all of their student data across 22 colleges replicated in the cloud. This new platform has some additional benefits. Because TCSG replicates this data to the cloud, institutions can now use these replicated copies for ad hoc reporting without going against their operational databases.

The specialized faculty TCSG retains at a single college can now be leveraged across the entire system. In 2022, 5,000 students participated in 100 cross-listed courses.

GOING FROM DATA TO INSIGHTS: LESSONS FROM HIGHER EDUCATION

SPEAKERS

Angie Bell, Vice Chancellor, Research and Policy Analysis, University System of Georgia

Jaya Krishnan, Chief Data and Analytics Strategist, Governor's Office of Student Achievement

Alice Zimmerman, Director of Business Intelligence, Technical College System of Georgia

Representatives from the University System of Georgia (USG), Georgia Academic and Workforce Analysis and Research Data System (GA AWARDS), and the Technical College System of Georgia (TCSG) shared how they use data to inform their work in higher education.

The USG is a system of 26 public colleges and universities in the state governed by the Board of Regents. The Research and Policy Analysis division at the system office is responsible for the functional side of data collection, data governance, and producing reports on the data.

USG worked with the Institute of Government to create a data visualization portal in Qlik that elevates system office and analytic capacity. This tool merges data from campuses with other data sources to produce analysis for all universities. The goal is to drive equity and analytical capacity across all USG institutions. The portal adds value by providing schools with multiple data sources to show trends, transitions, and

comparisons across USG. Individual institutions' actions can affect other institutions, so all schools must have access to data. The system office has put its focus on geography, student success, and job market data but is now transitioning to more public-facing tools. Using PowerBI, USG developed the **Georgia Degrees Pay tool** with the Institute of Government. The tool allows students to compare between institutions on student success, student affordability, and wage outcomes. The current focus is to develop a comprehensive dashboard strategy for monitoring operations and strategic KPIs and to move to real-time data.

GA AWARDS is **Georgia's longitudinal data system** that links individual-level data from many sources, including state education entities and the Georgia Department of Labor. GA AWARDS does not replicate or duplicate operational data but allows for more detailed research questions. For example, instead of looking at the graduation rate for three years, they want to be able to answer questions about how to alter the graduation rate. GA AWARDS made many decisions around the system's purpose and scope, project management type for implementation, system type, the responsible agency for the administration and maintenance of systems, and requirements for gathering data and functionality. They shared the lessons they learned from each step of the process, such as only collecting data points that will be used for formalized research questions, always looking for new meaningful elements, and incorporating reusable components and models. They maintain their system through continuous stakeholder engagement and standardization of data terminology. In the future, GA AWARDS hopes to build more dashboards around education to career, growing readers, and credentials. They have dashboards on the Governor's Office of Student Achievement (GOSA) website about high school outcomes, earning potential for different degrees, student discipline, school grades, and school types. Their data is used for the GOSA Annual Report and aids the Georgia Department of Education and other education policy makers.

TCSG offers adult education, high school equivalency programs, technical education, and workforce development through 22 colleges and 88 campuses, offering more than 600 programs. They have gone on a data maturity journey to best serve their schools and students.

Before their analytics journey, TCSG used crystal reports, SQL Exports, and Excel, focusing on basic visualizations and tabular data. Now, they use Cognos analytics which is easier to use and has **contextual menus and customizable, interactive dashboards.** They wanted a seamless transition between the two systems for lesstechnical users. The new system produces ready-made reports about student rosters and answers common data questions. More technical users can drag and drop customizations and answer more complex questions. The new system has improved data integration with reporting from multiple databases and data sharing with other agencies. It also has improved data security. The new system allows TCSG to monitor historical trend analysis across their colleges. They can also chart progress with reports and dashboards. TCSG has a new eCampus model where students can take online classes at any TCSG institution. The business intelligence office is monitoring the implementation.

ECONOMIC DEVELOPMENT DATA: HOW TO FIND IT, PRESENT IT, AND MAKE IT WORK FOR YOUR COMMUNITY

SPEAKERS

Marion Phillips, Research Manager, Community & Economic Development, Georgia Power

Sunny Anderson, Senior Business Attraction Manager, Decide DeKalb Development Authority

Marion Phillips from Georgia Power and Sunny Anderson from Decide DeKalb Development Authority spoke about how to find and present economic development data in local communities. Georgia Power's Community and Economic Development team uses a mixture of data tools focusing on specific topics, such as workforce analytics, business data, and demographics, to aid in their analysis to better understand their communities and customer bases. The team also uses a mixture of visualization tools to create easily digestible visualizations that support the story of the presentation.

The most important part of communicating data is the method of presentation. Understanding data storytelling is critical to effective presentation. When telling a data story, the first thing to consider is the audience. To whom are you presenting the data, and how will they receive it best? Then consider how to display the data. For example, some people like interactive maps that they can use independently; others may prefer a printout. Companies and governments can contact Georgia Power's Community and Economic Development team for assistance in finding and presenting their data.

Sunny Anderson from the Decide DeKalb Development Authority shared her experience working with Georgia Power both to answer questions from commissioners and to use data to tell stories tailored to a specific audience. She shared how Georgia Power helped answer questions about a multi-family affordable housing development project. A county commissioner asked who could afford new affordable units at 60 percent of the area median income, 80 percent of the area median income, and 100 percent. Georgia Power responded with a spreadsheet, and Decide DeKalb discovered that half of the groups they targeted for these units, like firefighters and teachers, could not afford them. It was an eye-opening experience and informed their decision to increase their area median income requirements so more people could afford the units.

USING OASIS TO PRIORITIZE COMMUNITY HEALTH OUTCOMES

SPEAKER

Gordon Freymann, Director, Office of Health Indicators for Planning (OHIP),
Georgia Department of Public Health

Gordon Freymann, the director of OHIP at the Department of Public Health (DPH), shared how to use Online Analytical Statistical Information System (OASIS) to prioritize community health outcomes. OASIS houses vital records, hospital discharge information, and census population data. OHIP translates that data into information for local and state health planning and assessment and makes that information available to anyone via OASIS. OASIS has several tools to provide the public access to health data information. The data can be filtered by age, race, ethnicity, gender, time, and county. OASIS shows data in table format, heat maps, and charts. These visualizations help visitors understand descriptive statistics, but there are other things to consider when using these tools to inform decision-making. For example, if a local community looks at its top 10 causes of mortality, it will need another metric to determine how to prioritize those things. Standard Mortality Ratios (SMRs) and Years of Potential Life Lost (YPLL) are metrics with which to prioritize causes of mortality. OASIS has a Community Health Needs Assessment Dashboard that can prioritize causes of mortality based on these metrics. This dashboard helps communities understand which causes of mortality are unique to their community or are particularly affecting young people.

OASIS has been a "home grown" product from the start. DPH first created OASIS in 1999 with in-house experts and infrastructure. DPH created data standards independent of Vital Records, assessed source data, metadata, and quality. DPH then translated the data so it matched in their warehouse. They created value fields, created a data warehouse, created OLAP cubes, and then designed OASIS applications.

DPH discovered that exemplary leadership and accurate metadata can help transform an organization to overcome inertia and become more data-driven.

FROM FLAT FILES TO REPOSITORY: LESSONS FROM BUILDING A DATA WAREHOUSE

SPEAKER

Stefanie Lopez-Howard, Statistical Analysis Center Director, Criminal Justice Coordinating Council

Samuel Gonzales, Research and Evaluation Program Director, Criminal Justice Coordinating Council

An executive order established the Georgia Criminal Justice Coordinating Council's Statistical Analysis Center as a CJCC function in 1992. The center supports data collection and analysis for the Justice and Compliance Division and the Victim Assistance Division. It also fulfills CJCC's statutory authority to serve as a criminal justice data clearinghouse and to provide policy-relevant criminal justice research. The team consists of 11 analysts and database administrators.

The center's core functions are to research and evaluate criminal justice data; to collect data for grant management and reporting; and to provide business intelligence and analytics.

When the analytic center began at CJCC, they collected data from IBM's Interviewer Server Administrator and from external partners' Excel spreadsheets. They first used Interviewer Server Administrator's download interface to download emailed files from partners to extract data. This process resulted in wide, unwieldy data files that were hard to parse and had multiple county and agency name iterations, making data cleaning difficult. These cumbersome data files inspired CJCC to create a better data repository—an eight-year process that cost about $1 million from multiple sources. The repository development required an independent contract business analyst, an independent contract data warehouse architect, a consulting team, and an ETL developer. The warehouse's final architecture consists of two repositories, a PowerBI interface, and public and internal agency data portals.

Now that the warehouse exists, it has many use cases. For example, the Georgia Coalition to Combat Human Trafficking uses data from the warehouse for visualizations. CJCC is developing a methodology to use administrative data sites to predict, identify, or proxy indicators of human trafficking. Another dashboard section has US Department of Labor Wage and Hour violations. CJCC uses the US Department of Labor Wage and Hour Division data to find outliers or specific businesses that have been found guilty of visa violations. They then leverage the repository to connect these data sets related to this area to find and prevent human trafficking.

DIRECTING THE DOLLAR: HOW DATA TOOLS ARE USED TO INFORM BROADBAND GRANTS ALLOCATION

SPEAKER

Eric McRae, Associate Director; Information Technology Outreach Services, Carl Vinson Institute of Government, University of Georgia

Eric McRae is an associate director of the Carl Vinson Institute of Government and the director of the Information Technology Outreach Service Division (ITOS). The Institute of Government has decades of experience with GIS and mapping, working with many state agencies. The Institute of Government has worked with the Georgia Technology Authority to develop Georgia's broadband map.

There are over 5,380,000 broadband locations in the state. In 2022, approximately 8.7% of the state was unserved. Over 50 providers provide data to broadband projects. Multiple federal and state grant programs are integral to the project, and there will be more grant programs soon.

The Institute of Government used GIS maps to develop detailed metrics about each location where broadband is and is not available. They then created condensed web maps to present the data in a more consumable way. They also created data visualizations for faster analysis.

The Georgia Broadband Availability Map is much more detailed and accurate than the federal FCC map. The FCC map used Census block data, while Georgia used address-level data. The Georgia Broadband Availability Map now informs all broadband grant decisions. Funding in Georgia totals $1,060,541,391, which does not include provider match dollars to address broadband needs. Of the $1 billion, $418,541,391 came from either local grant applicants or direct federal funding. The federal government provided $642,000,000, but the state directed the dollars through grants that were awarded based on the broadband map developed by ITOS.

Federal programs without state input have funded 189,877 unserved locations throughout Georgia. Programs to which the state directed the federal dollars have funded 208,050 unserved locations. Two remaining programs included Capital Project Funds Round 2 and Broadband Equity, Access, and Deployment (BEAD) Program. Because of the objective data-informed grant process, the state has significantly decreased the number of Georgians who do not have broadband access.

GETTING SMART ABOUT DATA SCIENCE

SPEAKER

James Byars, Data Analytics and Visualizations Unit Manager, Carl Vinson Institute of Government, University of Georgia

James Byars is the Data Analytics and Visualizations Unit Manager at the Carl Vinson Institute of Government. He explained analytical concepts central to data science, what the data science life cycle looks like, and how to recruit and retain data scientists at their organizations.

Understanding how data science terms, such as machine learning, predictive modeling, and big data, are defined is the first step in getting smart about data science.

Machine Learning (ML)

A discipline of AI focusing on computers (machines) using algorithms and data for pattern discovery and prediction without being explicitly programmed. Increasing available data and model training will improve the machine learning models' accuracy —like the "human" adage of "practice makes perfect".

Predictive Modeling

A branch of machine learning that makes predictions about future outcomes using historical data by using algorithms from data science, artificial intelligence, machine learning, statistics, and computational processes.

Big Data

Data that is too large and complex to fit on a single computer. Conventional strategies like traditional database storage and management approaches are computationally unproductive and ill-equipped.

There are five types of analytics questions that drive analytics work, ranging from simple descriptive statistics to very complex ones.

1) **Descriptive questions**, in which data provide a quantitative summary and should not be used for inferences or predictions.

2) **Inferential questions** examine the relationships between variables in data that can be generalized to a larger population.

3) **Predictive** questions use algorithms to generate guesses based on historical data.

4) **Prescriptive** questions use algorithms to determine the best course of action or outcome.

5) **Causal** questions explore cause and effect relationships between phenomena.

As organizations move from asking primarily descriptive to causal questions, they require more advanced data science skills. To best understand how to grow a data science team, it is helpful to understand the different data archetypes[2] of data scientists (**data businesspeople**, **data developers, data researchers, and data creatives).**

Data is rarely, if ever, clean. The process for a data scientist to answer the questions is called the **data science life cycle.** The cycle begins with obtaining data, scrubbing it, exploring it, modeling it, and then interpreting results. This process can be linear but often vacillates among the five steps.

Governments will be ready to start their journey in data science with a knowledge of terminology and core analytical concepts of data science; understanding of the data science life cycle; and the ability to evaluate their strategy to recruit and retain data scientists.

SUPPORTING STAKEHOLDERS WITH DATA-INFORMED DECISION MAKING: GADOE'S LESSONS LEARNED WITH GEORGIA INSIGHTS

GEORGIA DEPARTMENT OF EDUCATION (GADOE) SPEAKERS

Nicholas Handville, Chief Data Officer, Data Collections, Analysis, and Reporting, Technology Services

Adam Churney, Data Analysis and Reporting Manager, Data Collections, Analysis, and Reporting, Technology Services

Jeffrey Harding, Senior Research and Data Scientist

Nicholas Handville, the Chief Data Officer at GaDOE, spoke about the data collection, analysis, and reporting unit at GaDOE. The unit is responsible for collecting data, making value products out of that data, and handling data privacy. Its goal is to improve outcomes for students and educators in Georgia. GaDOE' data modernization initiative includes an overhaul of infrastructure, applications, and data. Georgia Insights is a new initiative focused on improving the clarity and accessibility of district- and school-level data through public-friendly and easy-to-use dashboards. GaDOE has a new website in the works to house Georgia Insights.

Adam Churney, the unit's Data Analysis and Reporting Manager, shared why Georgia Insights needed a redesign. GaDOE needed a single go-to location for all public-facing data. Over the past couple of years, they've built many public-facing dashboards. One example is the Technology Inventory Dashboards that share the laptop-to-student ratio, which highlights the availability of technology grants and technology equipment donations for use in public schools.

Jeffrey Harding, a senior data scientist at GaDOE, presented on the department's large amounts of administrative data. The data provides unique opportunities to leverage emerging technologies and methodologies. GaDOE can use its data to predict outcomes, but determining the best interventions is much more challenging. Local control and policy changes can create challenges in acquiring and querying data.

---

2. Harris, Murphy, and Vaisman (2013)'s data archetypes.

LOCAL GOVERNMENT GIS: THREE COUNTIES' JOURNEYS

SPEAKERS

Joseph D'Angelo, Chief Data Officer, Athens-Clarke County Unified Government

Matt Beal, GIS Administrator, Oconee County

Brian Lackey, GIS Manager, Information Technology Department, Columbus Consolidated Government

Local governments have different approaches to maintaining and operating GIS departments. Representatives from Athens-Clarke County, Oconee County, and Columbus Consolidated Government shared how their counties use GIS.

Overcoming Data Silos

All three counties' representatives discussed the importance of overcoming data silos by ensuring that more than one person in an organization understands where and how to pull the data.

Providing Return on Investment

Athens-Clarke County staff uses grants and volunteers to improve its GIS infrastructure and workforce. They also have a performance management analyst who determines appropriate benchmarks for the work of different departments and then tries to determine the return on investment for various activities. Additionally, **they create an interdisciplinary team** who tracks funding for large projects. Oconee County staff ensure they get the most use out of the tools they have. In 2021, the county started collecting Key Performance Indicators(KPIs) by using existing RGIS Online dashboards. Every department in Oconee County has a KPI dashboard using RGIS Online. Columbus has 10 high school volunteers who help with projects in multiple departments.

Public Interaction with Data

Oconee County staff have developed an app for the public to report litter locations around the county. Columbus staff have worked with Georgia Tech to address the problem of drowning at the downtown Columbus Riverwalk by installing cameras to detect when someone is in distress and send alerts to the fire department.

Next Generation 911 Compliance

Every county has work to do to ensure they will be Next Generation 911 Compliant. Compliance requires ensuring the system's addresses are accurate. Updating duplicate addresses can require changing street names and can also require supporting funds.

The panelists ended their discussion with advice for audience members who want to boost interest in GIS. Actively engage with the people you are working with to ensure you are a part of mapping projects across the county. GIS professionals are competent, creative, detail-oriented, and do many things in the community.

FROM SPREADSHEETS TO BUSINESS INTELLIGENCE: ONE AGENCY'S STORY

SPEAKER

Dr. Keith Osburn, Chief Information Officer, Georgia Department of Education

GaDOE oversees about 221 districts in Georgia, which covers 2,048 schools, 400,000 teachers, and 1.8 million children. Because the agency has access to so much sensitive data, GaDOE has a stringent policy regarding its data stewardship.

Everyone sees the value of data. We may not know it, but we use data daily to impact lives. Unfortunately, the problem for all data professionals to inherit and solve is that people often do not fact check if the data is correct. They allow whatever they read or see to fit into their existing worldview. This phenomenon is called **confirmation bias**. As a data scientist, you must be both an advocate for the valuable work of data and be ethical about the work that you do. Data are neither good nor bad; data's value is in the eyes of the beholder.

Technology moves quickly, and the success or failure of products is often due to companies' use of data. Data are powerful

Dr. Osburn develops, plans, and implements an information technology strategy that meets the agency's needs, delivers optimal return on investment, and leads the efficient operation of the technology services teams so that prompt modernization and upgrades are performed as needed. Dr. Osburn shared lessons from GaDOE's data maturity journey and spoke about the importance of data governance and innovation in public sector data work.

and a great equalizer. Research tells us that through compelling presentations of data can debunk situations of confirmation bias can be debunked.

The static, unique, siloed approach for the daily use of spreadsheets is not helpful. There must be a collaborative environment with a team of experts to enable and uplift the agency.

GaDOE strives to transform the way we interact and analyze data to positively affect the capacity for teachers to work, for students to learn, and for parents to receive the information they need regarding their children

The pandemic forced GaDOE to go through a technology shift. Overnight, the entirety of their workforce shifted into a socially distanced mechanism that still needed to impart knowledge. They had to become reliant on technology. Ultimately, however, the field of education saw transformation because the transformation became mission-critical.

GaDOE changed its view of technology as an asset to technology as a service. Technology is transformational. Today's work must be data-informed and data-driven. GaDOE has designed a data storage system as the jumping-off point for multiple new ideas and initiatives.

PRACTICAL TIPS FOR IMPLEMENTING CHANGE IN YOUR ORGANIZATION

SPEAKER

Dr. Donald Addison II, Terry College of Business, Executive Education Program, University of Georgia and managing partner with SC&E Partners

When a significant change comes to an organization, such as implementing a new system or process, how it will be rolled out to the employees needs to be considered as much as the new system. Most people work because they have to; they focus on job security, not innovation. Change threatens people, especially when they are talented in a past discipline. People feel threatened by change not because they are bad at their jobs or are bad people but because they are worried about their paychecks. Change management is essential to data-driven success.

Dr. Addison explained the change process and how to manage it for an optimal outcome. Every change impacts productivity. The goal is to minimize the dip in productivity, sometimes called the "Valley of Despair" (See Figure 4). The "Valley of Despair" and related employee resistance can be planned for and minimized.

When an organization wants to implement a change, how do they get buy in? Studies confirm the benefits a structured approach to addressing the people side of change has on project outcomes. The downsides of neglecting the people side of change include diminished results; loss of people unwilling or unable to make the change; wasted investment; stress costs; and damaged image within the company. A structured approach leads people to the stage where they can change their thinking. Organizations can increase buy-in to the change process by **preparing employees for the change** and being **truthful about the process**. If an organization neglects these actions, the culture around the transition will likely sour, and they may have to roll back changes or reduce the number of changes originally planned.

Employees resist change for many reasons, but here are a few examples: Individual predisposition toward change; surprise and fear of the unknown; climate of mistrust; fear of failure; loss of status or job security; peer pressure; disruption of


Before joining UGA, Addison was a senior vice president for Bank of America Merrill Lynch working in leadership development. Additional roles within the bank included a client-facing role as a change management executive in which he offered counsel to bank clients related to organization development and change management. Dr. Addison led the group through how to manage change in their organizations as they embark on their data maturity journeys.

70% of projects fail due to a lack of attention to **change management** and **change adoption.**

cultural traditions or relationships; personality conflicts; lack of tact or poor timing; non-reinforcing reward system; and ineffective change agents. In reality, it is a combination of the above reasons, group identity, and the history and culture of past failed efforts to effect change. To mitigate resistance to change, change leaders must explain why this change will be different, deal with resistance head-on, attack it up front, and address objections before training.

Figure 4. Change Curve

© 2019 SC&E Partners, LLC
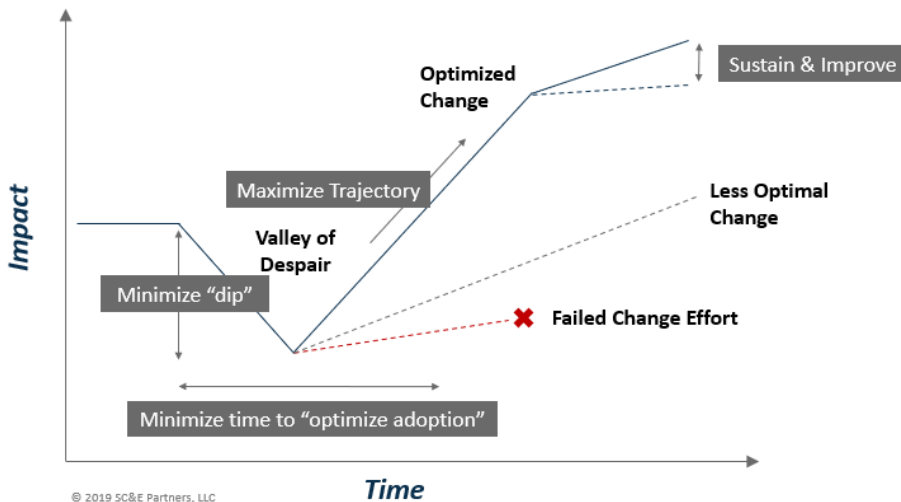
Dr. Addison explained seven tenants to manage the change process effectively.

Change management is the process, tools, and techniques to manage the people side of change. It looks beyond the technology or procurement process and focuses entirely on people.

Secure a good executive sponsor. An executive sponsor can help win support and buy-in at the executive level and lead by example by using data to inform decision-making.

Offer data literacy training. Organizations should offer data literacy training tailored to an individual's competency level to increase people's comfort levels with how to use and communicate data.

Deliver data-driven quick wins. When people get a taste of what is possible through real-world improvements, it becomes easier for them to envision the future state with data and get on board with the changes.

Communicate to build and inspire. Communication is a critical component of any successful change management strategy. In addition, people must know how to share insights effectively to inform decision-making.

Foster a collaborative relationship with business teams. When an organization can build a strong working relationship with business teams, it ensures that the data aligns with their needs.

Change advocates are another essential piece of this process. It is crucial to recruit team members not solely based on their technical skills but also their potential to build support, especially among skeptical groups of change targets.

There are many approaches to decrease resistance to unpopular decisions. Socializing the change is a critical step. Have meetings before the "meeting," to gain insights, discover reasons for resistance and work collaboratively to build support and momentum. **Transparent communication** means sharing good and bad information in a way that allows all to see the "why" behind the words. Share leadership's message. Acknowledge points of dissatisfaction, and empathize with those who may be negatively impacted. Accentuate the positives associated with leadership's final decision. When the leadership team makes an unpopular decision, assign a subcommittee to meet briefly to help craft a consistent message that team members will all share when speaking to the masses. This approach is known as **objection handling.**

Having an adoption framework and buy-in is essential when creating change to prevent problems from derailing plans. An adoption framework is an approach to realizing an opportunity or addressing a challenge that leverages the organization's collective intelligence and applies to large transformations and small change initiatives. If you use an adoption framework, the benefits include a heightened sense of employee ownership, increased employee engagement and motivation, and more champions actively driving change efforts.

HOW DATA ANALYTICS TRANSFORMED HOW GOVERNMENTS EVALUATE PROGRAMS

SPEAKERS

Kanti Chalasani, Division Director for the Georgia Data Analytics Center, Governor's Office of Planning and Budget; Leanna Greenwood, Data Team Supervisor, Georgia Board of Health Workforce, Georgia Department of Community Health

The Georgia Data Analytics Center (GDAC) collects data and creates easy-to-read dashboards for the public, lawmakers, and state decision-makers. GDAC partners with other state agencies to host dashboards that can aid in their public service missions. In this panel, Kanti Chalasani, the Division Director at GDAC, and Leanna Greenwood, the Data Team Supervisor at the Georgia Board of Health Workforce (GBHW), spoke about the development of GDAC and their partnership to create state health dashboards.

The panel discussed the creation role of GDAC and shared the journey of GBHW in the creation of the healthcare workforce dashboards. The panel also discussed how state agencies can partner with GDAC to create specific data solutions for their agencies.

GDAC has transformed the state's collection and analysis of agencies' data over the past three years. Chalasani started her role in December 2020 with no data visualizations produced. GDAC needed a modern data architecture to allow them to be the data repository for

the state. GDAC had the data cloud built within a record 120 days, which was possible due to great agency partners, committed leaders, and a driven team willing to learn. The GDAC team was engaged, and they learned quickly. Because the data collection and processes are replicable, the process will continue to improve and become faster. Use cases fuel the world of GDAC.

State Health Licensure Dashboard Use Case

Leanna Greenwood, at GBHW, worked with Chalasani and the GDAC team on their state health licensure dashboards. The passage of the HB 1013 bill, the Mental Health Parity Act, made the partnership with GDAC timely. HB 1013 requires healthcare professionals to submit a survey during their re-licensure. Mandatory survey data within Georgia is relatively new and has yet to be implemented in all agencies.

The data limited the research questions. Previously, the healthcare workforce board had not been involved in the questions on the licensure surveys. Demographics, practice information, specialties, board certification, and more are already in the data. With the passage of HB 1013, the healthcare workforce board now owns that data set. With HB 1013, the dashboards will change in some ways because they will be directly involved in asking workforce-specific questions. The legislature is the crucial audience of these dashboards. Every year during the budget process, GBHW uses these dashboards to inform the legislature about the state of the workforce and inform their budget process. Also, GBHW often gets media requests about the healthcare workforce; they can direct reporters to GDAC's website.

The goal of GDAC is to provide accountability, and transparency of state agency data. All agencies have their own agency-specific data. When the agencies partnered with GDAC, they learned what other external data exist and how GDAC can be a resource in answering research questions.

"THE GREAT BI TOOL BAKE OFF"

Sahar Voghoei, Scientific Computing Professional Specialist, Carl Vinson Institute of Government, University of Georgia

Scott King, Scientific Computing Professional Specialist, Carl Vinson Institute of Government, University of Georgia

Emily Franklin, Fiscal Analyst, Carl Vinson Institute of Government, University of Georgia

The conference ended with a Business Intelligence (BI) Tool "Bake Off." Three data scientists from the Carl Vinson Institute of Government created dashboards in Power BI, Qlik, and Tableau using economic data from the Bureau of Economic Analysis. Each data scientist walked the audience through their dashboard and described the process of building it out, highlighting the specific features that were unique to each tool. All of the panelists had things they liked about their specific tools, but they also pointed to features they wish they had, or troubles that came up in designing each dashboard.

Conference Success

Over **200** participants from **70** organizations

including **k-12, higher education, state agencies, court systems, cities and counties**, and **regional commissions.**

94% of participants reported that the conference **met or exceeded** their expectations.

88.2% responded that the conference is **useful or extremely useful** to their work.

"Loved it! Great work and we will be back for the next one. This was truly the first step in building the much-needed community around data and analytics in Georgia."

The conference highlighted **critical topics** such as **assessing organizational data maturity**, **what executives need from data**, and **implementing change in your organization**.

CONFERENCE REFLECTIONS

By David Tanner and Anna Wrigley Miller

Our inaugural Developing Data Analytics Capabilities Conference was a great success. It created a unique forum for business and technical people in data science and analytics to network and learn from each other. The cross-section of state and local government organizations and employee roles fostered great conversation and networking. We are passionate about sharing information and learning at the Carl Vinson Institute of Government. The following are our reflections on the conference and the great information that was shared. Six big ideas stuck out to us.

Context Matters.

Caitlin Dooley said, "Involve data analysis from the start. They need the context." By including data scientists from the beginning, a collaborative relationship between the data team and the business team will lead to better solutions.

Poor data begets bad analysis. Data scientists need to know the source and quality of their data. Technology is a service, not an asset. It must inform policy, transformation, and strategy to fuel outcomes.

Sharing data outside the organization or program silos is the beginning step to creating more impactful analysis.

Data analytics can have a greater impact if **organizations share** data to address a common program, evaluation, policy, or budget question.

Create dashboards for the intended audience.

Keeping the audience in mind is critical when designing dashboards. Not knowing the different audiences who might view the data is a common pitfall. Most leaders prefer simple and clean visuals. To inform a deeper analysis requires a more complex dashboard. Complex dashboards require clear navigators or analysts to explain them to users. We were all reminded that users must be able to understand what is being presented.

When building the capacity of a data science team, keep the Data Science Architypes[3] in mind to ensure a balanced team.

Data Businesspeople focus on project management and emphasizing a project's return on investment and connection to policy, budget, or program evaluation.

Data Developers focus on the back end and technical requirements.

Data Researchers have extensive academic training and experience, are curious and make new connections.

Data Creatives are "jacks of all trades," trained in the breadth of the necessary technical and substantive skills.

---

3. *Harris, H., Murphy, S., & Vaisman, M. (2013). Analyzing the analyzers: An introspective survey of data scientists and their work. O'Reilly Media, Inc.*

Analysis and visualization work is a new role in organizations and it must be resourced and professional.

The capacity of an organization's staff to support and do analysis and visualization work drives data maturity. **Organizations must budget and plan to become data analytics organizations.** This growth does not happen overnight; it is intentional, grounded in the strategic plan, and led from the top.

Attention to change management is critical to a project's success.

Don Addison shared, **70% of all projects fail due to lack of attention to change management.** Preparing people for the change and being truthful about the process are critical to implementing any new technology or process.

The inaugural conference successfully kicked off the Vinson Institute's work in building analytical capacity in governments across Georgia. We aim to sustain this work through training, regular webinars, and an annual conference. Growing a governmental data community in Georgia is exciting, and we invite all with an interest in this work to join.

2023 DEVELOPING DATA ANALYTICS CAPABILITIES
CONFERENCE PROCEEDINGS

Georgia Data Innovation Hub
Carl Vinson Institute of Government
UNIVERSITY OF GEORGIA