

Visualizing the Pipeline

The Importance of Cross-Sector Data

Education and workforce systems do not exist in silos; yet for decades, their data systems did. Cross-sector data is essential for understanding the education to workforce pipeline. Bringing together early childhood, K-12, higher education, and workforce data helps policymakers determine the effectiveness of the education continuum by identifying how individuals perform from one sector to the next. By leveraging cross-sector data, leaders can identify “leaks” in the education to workforce pipeline and understand where the system could use the most support.

The COVID-19 pandemic put additional strain on the education and workforce systems. Students are experiencing significant academic and mental health impacts, enrollment has declined, and there have been major shifts in the labor market. The pandemic also highlighted how interconnected these systems are, and the economic relief packages present an opportunity for states to invest in systems and tools that bring to life areas for improvement for policymakers, practitioners, and the public alike.

Multiple policy organizations, such as [Data Quality Campaign](#) and the [Education Commission of the States](#), have documented the fact that many states have invested in quality P-20W systems over the past few decades. Although connecting previously siloed data systems is a critical first step for better data use and transparency, few states present all of that data together, in an accessible format that is easy to interpret and can be used to drive decision making.

This brief explores lessons learned from states that have developed high-quality cross-sector data dashboards; questions for policymakers to consider when undertaking a data visualization project, and recommendations for how to effectively build out an early childhood to workforce data dashboard that can drive policy and inform the broader public about the state’s talent pipeline.

Many quality cross-sector data visualizations also exist at the community level. The StriveTogether Network advocates for the use of seven cradle-to-career outcomes: kindergarten readiness, early grade reading, middle grade math, high school graduation, postsecondary enrollment, postsecondary completion, and employment. Additionally, StriveTogether supports partner communities in collecting, analyzing, and sharing that data.



Baltimore's Promise created the [Baltimore Youth Data Scorecard](#) that captures key health and education indicators from birth through career. A page for each indicator shows changes over time by race and ethnicity and an explanation of the city's performance on each metric.



All Hands Raised's [Community-Wide Indicator Dashboard](#) captures data on 14 metrics across six districts in Multnomah County, Oregon. The data is disaggregated by school district and student demographics.



Cradle to Career's equity-centered [Data Dashboard](#) highlights the seven StriveTogether indicators for Tucson, AZ with additional disaggregation by student subgroups and visuals demonstrating opportunity gaps.

Lessons Learned from Statewide Cross-Sector Data Visualization Projects

A number of states have already built high-quality, publicly available data dashboards highlighting metrics across the education and workforce pipeline. ESG interviewed leaders from six states—Arizona, Georgia, Kentucky, North Carolina, Texas, and Washington—to understand the process they underwent to create their dashboards. Additionally, ESG has provided strategic guidance to Indiana and Minnesota, who are embarking on similar early childhood to workforce dashboards. The following key steps of the dashboard development process emerged from these conversations and through ESG's work with states on data visualization projects.

Getting Started

Identify who will manage the project.

While the process of creating a cross-sector dashboard should be collaborative, it is also important to identify what agency or organization is leading the work. In some states, such as Texas and Arizona, the dashboards were created and managed by nonprofit organizations. Texas 2036 and Education Forward Arizona (formerly Expect More Arizona) saw an opportunity to build a central place for stakeholders to understand their state's progress on key education and workforce metrics. Housing the dashboard with an outside organization can have some benefits, such as more flexibility in the selection of platforms or vendors for the development of the dashboards and being able to set targets that exceed the state agency's internal goals. However, data sharing agreements may be more of a challenge and there is an additional need to build stakeholder buy-in to ensure policymakers see the dashboard as a useful tool.

In some states, the organization that manages the dashboard project is a state agency or governor's office. Georgia's dashboard is housed in the Governor's Office of Student Achievement; housing the dashboard in a governor's office can help build the political will to create and use the dashboard. In Washington, the Education Research & Data Center is housed within the Office of Financial Management, and in Kentucky, KYSTATS is a state agency legislatively authorized to collect and link data across sectors. A clear benefit of housing a dashboard within a government agency is it simplifies data collection and sharing. It also means the data project is subject to continued legislative approval; however, once policymakers see the utility of the tool, the hope is that they will want to continue funding access to the data.

Determine the audience.

Identifying the intended audience of the dashboard is an essential early step that will shape the stakeholder engagement strategy, the metrics included, and the design and functionality of the dashboard. While all of the dashboards ESG examined are available to the public, their target audiences vary. Some organizations, such as Education Forward Arizona, aim to build the public will to support education. Others, like myFutureNC strive to help leaders from across the education continuum and the state to identify leaks in the education to workforce pipeline and determine potential solutions. In Washington, the primary stakeholders are policymakers, and the goal is to equip them with data and visualization tools to be able to quickly interpret the data.

Determining the intended audience ensures the dashboard will be accessible by the desired users. For example, a dashboard geared toward voters who have varying degrees of understanding about education issues should have easy-to-interpret visuals and clear explanations of the metrics with the ability for users to filter by region to understand the context in their community. On the other hand, a dashboard for practitioners may have more complex visuals with the ability to filter by demographics in order to identify gaps in service. Because myFutureNC wanted to equip community leaders to use the dashboard, they created the pre-populated two-page PDFs outlining each county's progress on the metrics. In Georgia, the dashboards are simple and easy to use for the general public, but the underlying data is made available for researchers who want to dig in further. Clarifying the intended audience early on will help shape many of the subsequent decisions that need to be made.

Determine the dashboard builder and host.

In addition to who will lead the data visualization project, it's important to determine how the dashboard will be built and where the dashboard will live. For example, in Indiana, although the Governor's Workforce Cabinet is spearheading the project, the Management Performance Hub—the state's data warehouse—will build the dashboard. The Management Performance Hub has the capacity and technical expertise to build the dashboard and also houses the data to be able to update the dashboard. If an outside agency will be creating the dashboard, then the organization will need to use publicly available data or create data sharing agreements in order to receive the data from the state. Project leaders should consider both who has the capacity to build the dashboard and where it will be most likely to reach the intended audience.

Questions to Consider

Leaders should consider the following questions when embarking on a cross-sector data visualization project.

1. Who is the intended audience?
2. What questions do we want users to be able to answer from this dashboard?
3. Who will manage the data visualization project?
4. Who will host the dashboard and what is their capacity to build and maintain the dashboard?
5. How will the dashboard align with or influence state policy goals?
6. What metrics are state agencies already tracking?
7. How do we want to disaggregate the data?
8. What data are available?

Identifying Indicators

There are hundreds of metrics that could be included in a dashboard that spans early childhood to the workforce, so one of the main tasks policymakers must prioritize is narrowing down which metrics to include in a dashboard.

Additionally, the Bill & Melinda Gates Foundation has a forthcoming education to workforce framework that will highlight key metrics that have been evaluated based on seven different criteria: predictive, meaningful, feasible, valid for disaggregation, comparable, and minimizes unintended consequences.

This chart contains some of the most commonly used metrics across the statewide cross-sector dashboards ESG reviewed.

EARLY CHILDHOOD

- Kindergarten Readiness
- Quality Early Learning
- Pre-K Enrollment

K-12

- Early Grade Reading
- Middle School Math
- Chronic Absenteeism
- College and Career Ready Indicator
- ACT or SAT Performance
- Early College Credit
- High School Graduation Rate

POSTSECONDARY EDUCATION

- FAFSA Completion
- Postsecondary Enrollment Rate
- First Year Success (GPA, Credits, Gateway Course Completion)
- Postsecondary Persistence
- Graduation Rate

WORKFORCE

- Median Earnings
- Earning a Living Wage
- Employment Rate
- Opportunity Youth

Bring together the experts.

In many states ESG interviewed, deciding on which metrics to use was a collaborative process that brought together experts from across the education and workforce spectrum. In North Carolina, three subcommittees representing PreK-12, postsecondary, and the workforce created a list of priority indicators, and then myFutureNC brought together national and state experts and researchers to help refine the list. Similarly, Arizona brought together experts from K-12, higher education, and the workforce who worked together to identify key indicators, definitions, and available data sources over a six-month period.

Start with research questions.

States considered the research questions users would want to answer using the dashboard, and then identified the metrics needed to help answer those questions. In Georgia, the Governor's Office asked researchers from each of the state agencies to generate research questions they would like to answer with a longitudinal data system. That ask resulted in a list of about 50 indicators which were then narrowed down based on which indicators were most overarching across sectors. Kentucky's KYSTATS began with a high school feedback report that aimed to answer major questions about how students fared in postsecondary education. Now the system produces 10 annual reports on different sections of the early childhood to workforce pipeline. The metrics for each report were determined through research questions identified in focus groups and the KYSTATS research agenda.

Beyond helping determine the indicators, identifying questions can also help determine the functionality included in the dashboard. Do stakeholders want to see the impact of a policy change or economic disruption? If so, include a graph showing changes in the metrics over time and highlighting when the policy shift or economic disruptions occurred. In Indiana, stakeholders wanted to understand how progress on each indicator varied by regions of importance (such as community college service districts or economic development regions). From that desire came the idea to allow users to filter by county and to group multiple counties together to build a region.

Survey current metrics.

Taking inventory of the current measures being used by and reported on by different systems is a logical place to start. In Indiana, the state already has a number of high-quality data dashboards owned by different agencies; what it is missing is the cross-sector element. The process in Indiana began with a review of those dashboards to identify which measures agencies were already tracking and determining which measures could be linked across sectors. Starting with current metrics also begins the process of identifying what data are readily available and where new metrics will need to be developed.

Determine data availability.

Data availability impacts which metrics can be included in the dashboard. Identifying data availability should occur early on, before building buy-in for indicators. In some cases, new measures can be created, but when this is not possible, proxies may be used instead. For example, in Arizona, stakeholders wanted to see teacher retention as an indicator, but teacher pay had to be used instead.

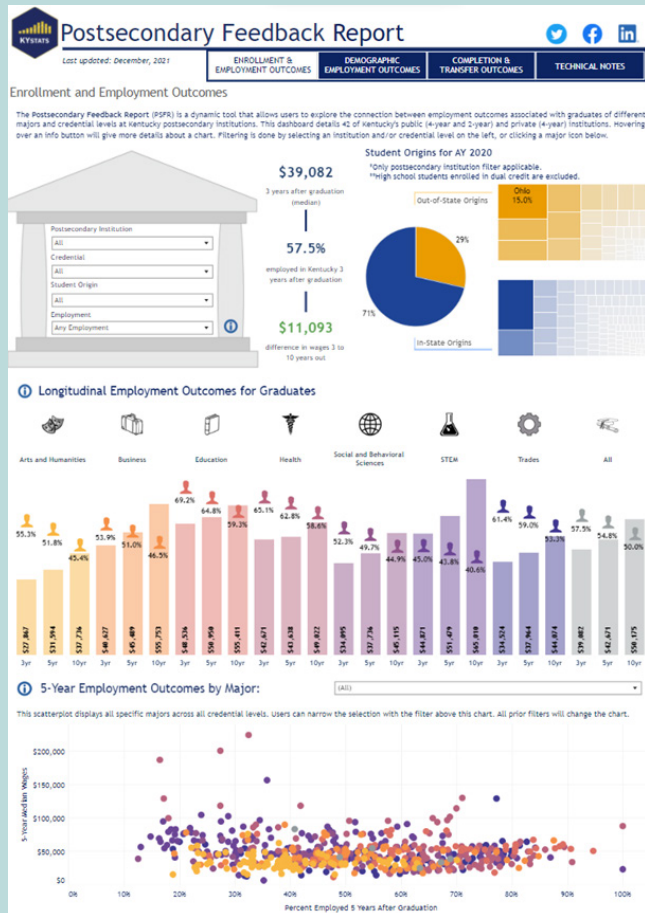
Disaggregate the data.

Beyond the main indicators, it is also important to determine how the data should be disaggregated as well as data availability for the disaggregation. The majority of the dashboards reviewed disaggregate data by race, gender, socioeconomic status. Others also disaggregate results for students with disabilities and English learners. Many dashboards also allow users to disaggregate by region, county, city, or even school. Some dashboards provide additional disaggregation for certain metrics. For example, Kentucky's dashboards provide additional disaggregation such as employment rates and median earnings by college major, postsecondary institution, CTE completer status, and participation in work-based learning. If the ability to disaggregate by demographics or region is not available for a particular metric, leaders will need to decide whether to move forward with that metric or use a proxy that can be disaggregated.

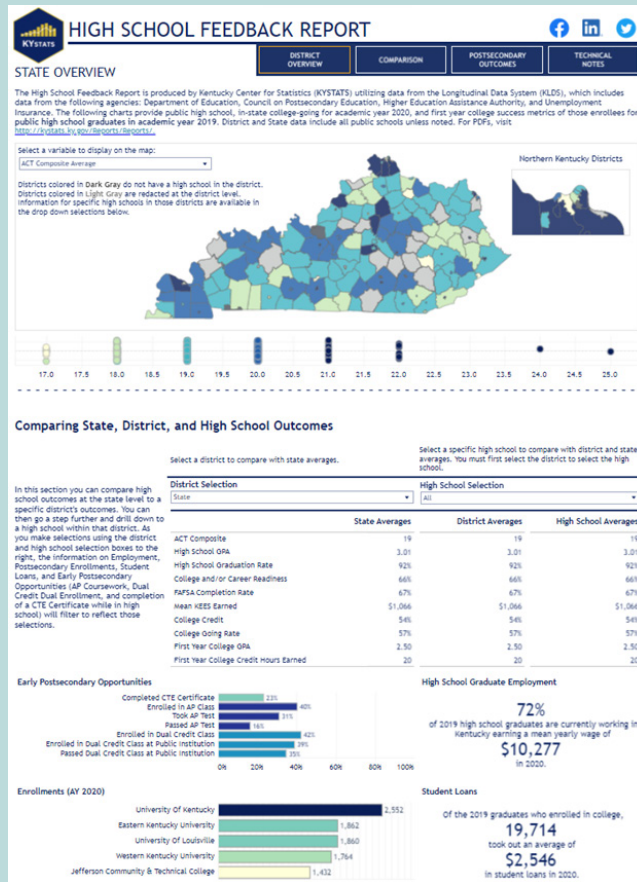
Look to other states.

It can be useful to policymakers to compare their state's progress to leading or neighboring states. Looking at the indicators other states have prioritized as well as how they define each metric can help leaders determine which metrics to prioritize. North Carolina, for example, shifted from a five-year to a four-year graduation rate when they noticed other states were using the latter.

KYSTATS collects and links data across the education to workforce continuum to help policymakers, agencies, and the public make data-informed decisions. Reports fall into one of six categories: Early Childhood, K-12, Career and Technical Education, Postsecondary, Adult Education, and Workforce. KYSTATS manages to display large datasets in dashboards that are easy to read and manipulate.



The primary reports, called “Feedback Reports,” establish links across sectors. For example, the Postsecondary Feedback Report displays longitudinal employment outcomes—employment rates and median wages—of graduates of Kentucky postsecondary institutions.



Dashboards allow users to disaggregate the data by demographic characteristics (such as gender, race, low-income status, adult learner). Most dashboards also display results by district, county, or region. Dashboards also provide additional filters unique to each topic, such as program intensity for the Career and Technical Education Feedback Report and institution, major, and degree level for the Postsecondary Feedback Report.

Setting Targets to Align with Policy Priorities

A number of dashboards not only show where the state is currently on each indicator, but also put that number in the context of progress toward a goal. Whether targets for each indicator are included in the dashboard or the dashboard is used to help the state set policy goals, cross-sector data dashboards are excellent tools to establish and communicate goals.

Ask the experts in your state.

Many states looked to the agencies within their own state to learn how they set targets and to align with targets already established by agencies. In North Carolina, myFutureNC engaged with the State Board of Education, the Department of Commerce, and Carolina Demography, among others, to understand their processes for setting targets. Arizona strived to align with the state's ESSA plan goals and postsecondary attainment goal that was being set when the dashboard was in development. In some states, like Georgia and Washington, targets were already pre-established by the Governor, legislature, or state agencies.

Compare with other states.

Another benefit of tracking the same metrics as other states is that leaders can then benchmark against those states. Dashboards created by the nonprofit Texas 2036 look at a dozen peer states to help guide their target-setting, and North Carolina's dashboard features the ability to compare the state's progress on certain metrics to the leading southern state.

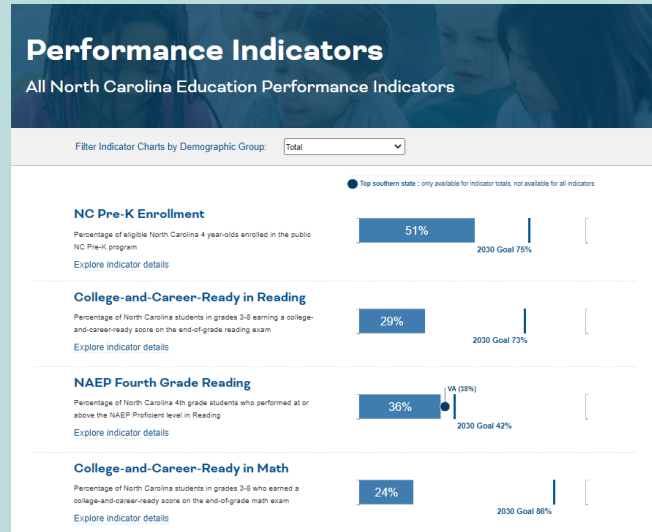
Build interim benchmarks.

Setting long-term, ambitious goals that will make a big difference in outcomes for students and workers in the state is a great place to start; however, communities need realistic benchmarks along the way. Identifying interim goals will help policymakers know whether progress is on track and where more resources and support may be needed to meet the end goals. North Carolina set its targets 10 years out and is working to establish interim goals.

Consider equity targets.

Setting overall target numbers for each metric lays the groundwork for where policymakers need to direct their attention, but policymakers should also identify areas where there are large differences between subgroups. The reality is that no state is going to be able to meet its goals without providing support to underrepresented student groups who experience systemic inequities, such as adult learners, people of color, economically disadvantaged individuals, and individuals with disabilities. Targets do not need to only be meeting a certain percentage statewide but should also include goals to reduce disparities among underrepresented groups.

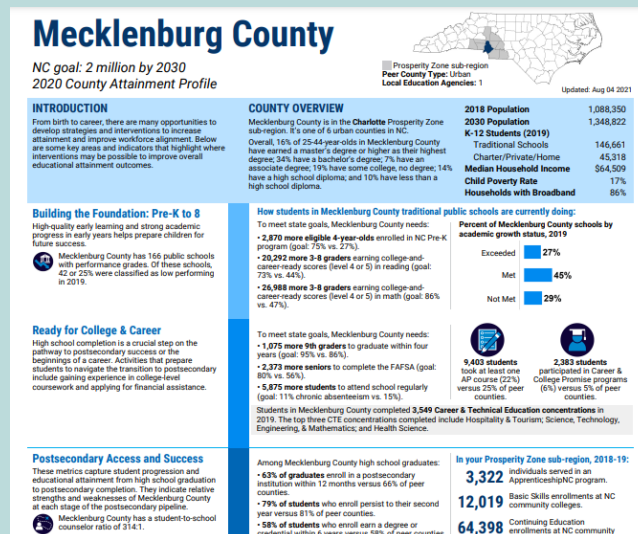
The myFutureNC dashboard measures the state's progress toward ensuring two million North Carolinians ages 25-44 earn a high-quality degree or credential. The dashboard focuses on key transition points related to academic readiness, college and career access, postsecondary completion, and workforce alignment with 18 indicators that span from early childhood to the workforce.



Sixteen of the 18 indicators show progress toward the state's 2030 goals and 13 show how the leading southern state compares.

The dashboard uses simple, easy-to-interpret bar graphs for each metric.

Users can learn more about each indicator, including the organizations, agencies, and initiatives across the state working to improve the indicator.



Attainment profiles for each county provide additional details on how the county is performing. These profiles also convert percentages into numbers, so community leaders can see how many more students need to meet each indicator to reach the state's goals.

Engaging Stakeholders

All of the leaders interviewed stressed the importance of using a collaborative process to create a cross-sector data dashboard. Engaging stakeholders not only ensures the dashboard meets the needs of its end users, but it also helps build early support for the tool.

Seek diverse and representative engagement.

Engaging with the individuals who will ultimately use the dashboard to gather insight into what data would be most useful to them is essential for designing an accessible and user-friendly dashboard. Indiana surveyed school districts, colleges, nonprofits, foundations, workforce boards, and state agencies to gather information about which metrics to use and desired functionality. Kentucky followed a similar process, conducting focus groups to get stakeholder input on which questions needed answers. Focus groups included potential users across various levels, such as students, teachers, superintendents, and the state. Texas 2036 similarly sought stakeholders that represented the diversity of the state: individuals from various agencies, roles, and counties. Engaging a representative sample from the intended audience will ensure the dashboard meets the needs and desires of users.

Go to the people.

Designing a dashboard should be a collaborative and iterative process. Several states have taken advantage of existing meetings to connect with stakeholders. In Georgia, the dashboard team joined any opportunity, such as conferences and annual superintendent meetings, to engage with education and workforce leaders to identify where along the pipeline support was needed. Many states mentioned returning to stakeholders and advisory groups on a regular basis to share updates and receive additional feedback on metrics, functionality, and design. Effective stakeholder engagement will not only gather feedback but will also help build buy-in for the project and start to identify champions of the work.

Building Buy-In

Building the dashboard is only half of the equation; the second part is ensuring the dashboard is being used. As one cross-sector dashboard expert explained, “Data is only the beginning of the conversation. If you have a robust system, and no one is using it, then it’s just an IT project.”

Collective action is key.

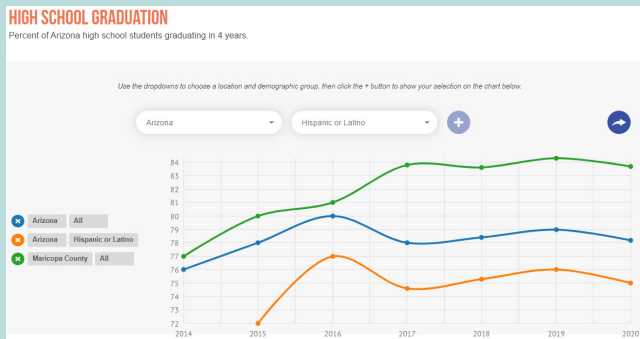
The only way to move the needle on the established metrics is to ensure communities across the state are committed to improving outcomes. Arizona’s dashboard embodies this theory of change, believing that collective action will result in movement. The team at Education Forward Arizona brings education and business leaders together to use the dashboard to set their own attainment goals for their community and supports community leaders in starting to build out an action plan. The community goals vary—some are higher and some are lower than the statewide goal—but supporting each community in working toward an attainable goal will improve the state’s outcomes.

In North Carolina, myFutureNC uses the county profiles to help identify three high-impact strategies that will help each county be on-track with peer counties. Not only does this strategy help leaders focus their efforts, but it also builds competition as counties try to outperform their peers. Additionally, the county profiles show how many more individuals are needed to meet a particular goal. For example, in 2021, Mecklenburg County needed 2,372 more seniors to complete the FAFSA in order to meet the state’s 80% completion goal. Converting percentages to numbers gives leaders a concrete understanding of how close they are to a goal.

Equip communicators.

The individuals who participated in the stakeholder engagement process are already familiar with and have a level of investment in the project, and can be useful advocates for sharing information about the project with their communities. Education Forward Arizona created ready-to-use communication toolkits about the dashboard that were shared with all of the organization’s partners and has a number of social media and communications tools on its website. Arizona also relies on storytelling to highlight momentum and connect leaders across the state.

The Arizona Education Progress Meter highlights seven key metrics to inform the public of where the state stands on issues from early learning through postsecondary attainment.



Users can filter the data by county, city, district, or school. For each metric, users can also view how the metric has changed over time and plot additional lines by race, socioeconomic status, disability status, and English learner status.

The easy-to-interpret visuals make this dashboard accessible by the public. Radial graphs show progress toward the goal for each of the seven metrics along with indicators of whether the metric has improved, remained the same, or declined over the past year.

Final Recommendations

1. Lead with the “why.”

Strong buy-in is needed throughout the project to ensure the dashboard is not only built, but also used. In communities where data dashboards are already available, make the case for the unique value of this project. Perhaps this project is creating a centralized place to view key metrics and connecting data that are usually siloed by sector. Once the dashboard is developed, build the will of people to actually use it by helping users interpret and tell a story with the data. For example, the [Root Cause Research Center](#) in Kentucky builds a narrative with their data by integrating GIS mapping with policy context to guide users as they explore the data.

2. Build a strong data governance structure.

Effective cross-sector data visualizations rely on quality longitudinal data systems, and the best systems are supported by leadership-level, sustainable cross-agency governance bodies. A cross-agency data governance body can help ensure that data projects are transparent and sustainable. These governance bodies are able to respond to the state’s unique needs, build a culture of data use, and ensure data projects have sufficient capacity and resources.

3. Focus on the metrics that are most essential for the purpose and audience.

Including too many metrics can overwhelm users and clutter the dashboard. Prioritize metrics that are predictive of future success, can be improved through policy and practice shifts, and are aligned with the audience’s research questions.

4. Use the dashboard to promote further exploration.

Whether it means connecting to other agency dashboards, sharing the underlying data, or highlighting organizations working to improve the metrics, a good data visualization tool will equip users to dive deeper into the indicators.

5. Invest in capacity for the initial build and ongoing updates.

Data work is capacity-heavy, so it is important to make sure there is enough capacity, expertise, and budget to execute a data visualization project. Building a dashboard is not a one-time project; there needs to be a process to continually review and update the dashboard. This includes updating both the data itself as well as changing indicators as new and better measures come about.

6. Be transparent about the data.

Ensure there is a process in place to regularly update the data and communicate how frequently the data are being updated. Be sure to also include where the data come from, direct users to where they can find publicly available data, and allow users to download the underlying data, when possible.

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Texas 2036