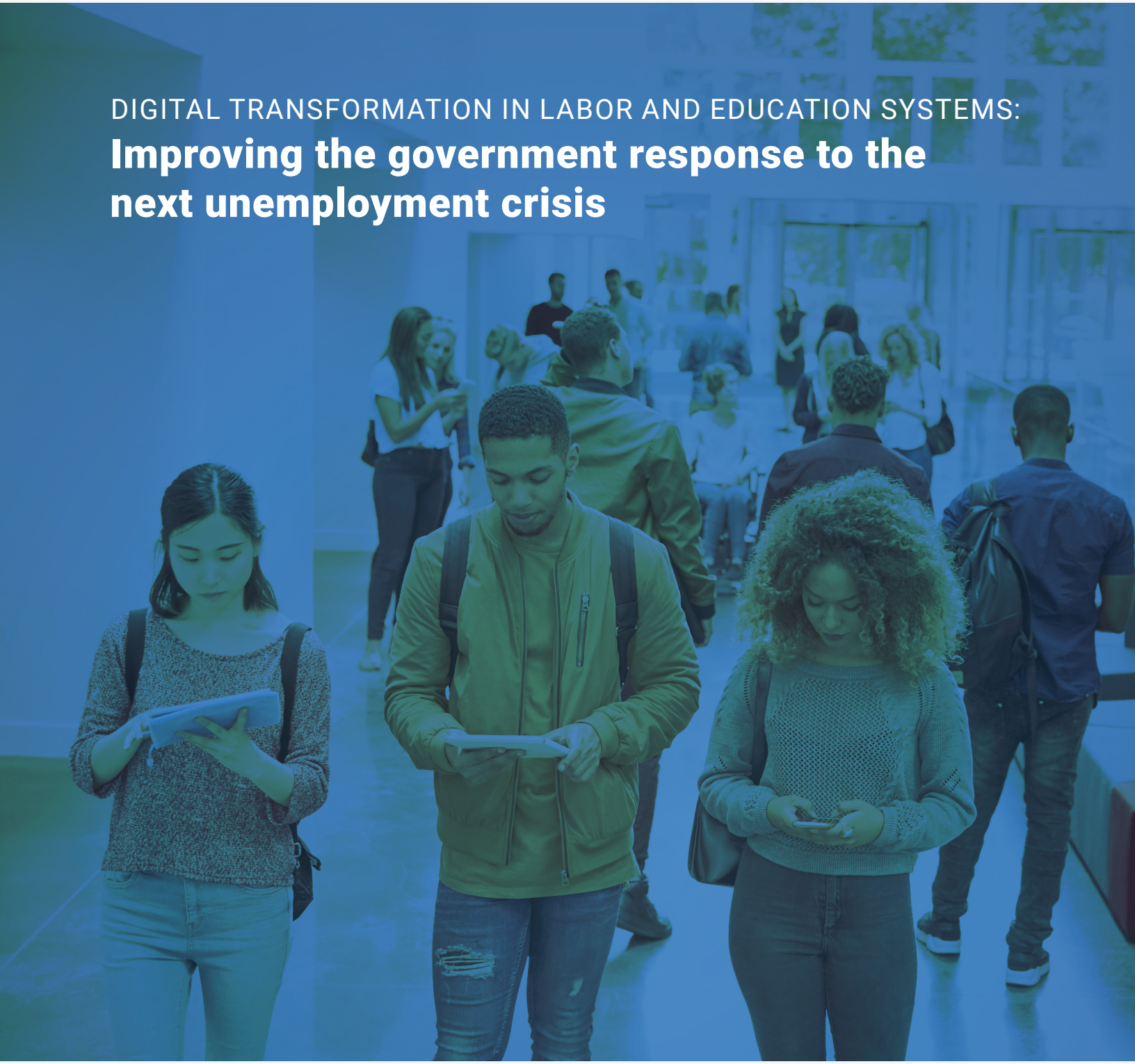
Metropolitan Policy Program
at BROOKINGS

DIGITAL TRANSFORMATION IN LABOR AND EDUCATION SYSTEMS:

Improving the government response to the next unemployment crisis



ANNELIES GOGER AND **JANIE MCDERMOTT**

JULY 2021

INTRODUCTION

In spring 2020, as the COVID-19 public health lockdowns unfolded, an unprecedented wave of displaced workers applied for unemployment insurance (UI). But in many cases, getting UI to these millions of workers was a fraught process.

"I don't have home Internet, because I had gotten rid of it a few years ago to save money," a Washington, D.C.-based barista who wanted to remain anonymous told us in June 2020. "I had to file for unemployment on the phone, and I called every day for about a week-and-a-half before I got through. And when I got through, I had been on hold for about six-and-a-half hours. It was 12 weeks before I received unemployment."

Unfortunately, stories like this were the norm, rather than the exception. States were hard pressed to process claims accurately and quickly, because UI application processes rely heavily on a staff member making decisions about claims, even for applications filed online. Hiring new staff and contractors was a necessary first step, but it often added friction since it can take years for staff to fully onboard. (In California, the training manual is 800 pages long and UI call center staff training typically takes at least six months.[1]) And even though Congress passed unusually generous expansions to UI in March 2020's CARES Act, that relief didn't get out quickly enough to end users like the barista above. These systems failures imposed deeper costs by further eroding trust in government.

These high-profile UI breakdowns were rooted in more than 30 years of declining funding in broader labor market programs, including cuts to the technology, staff capacity, and data infrastructure that support them.[2] Since the 1980s, policymakers have intentionally cut these programs and services, tightened eligibility requirements, and decentralized program administration and governance.

Decentralization gave states and local areas more control, but with fewer resources; it also produced a landscape in which the resulting 53 systems across U.S. states and territories became more divergent from each other over time, with different benefit levels, processes, and more customized data systems.

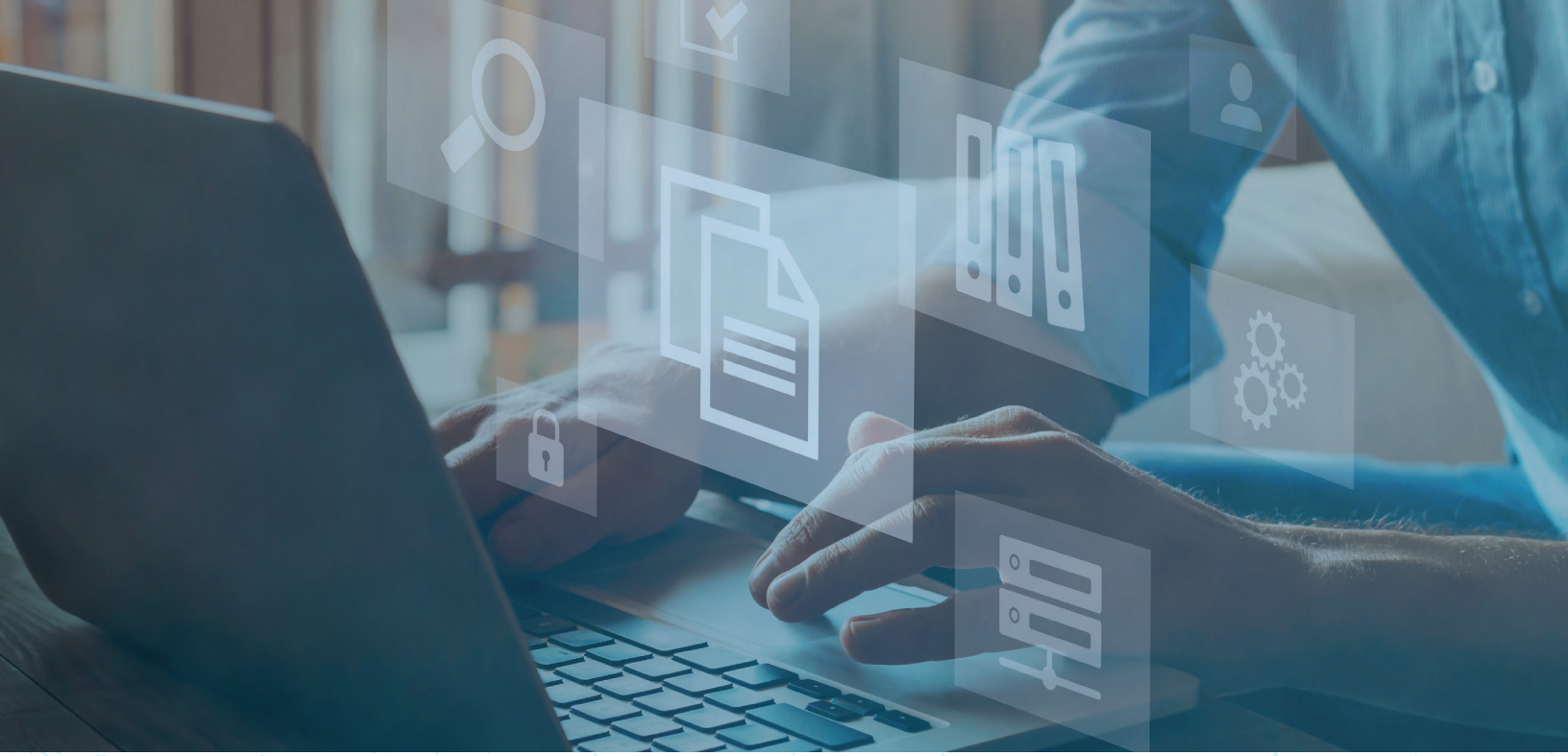
This nationally uneven and under-resourced setup has negative consequences beyond access to UI benefits. Variation across systems makes it hard for federal policymakers to boost national capacity in a crisis or update security measures quickly and cost-effectively. And it is time-consuming and challenging for state and local programs to securely share data across programs.

At a fundamental level, the state of these systems hampers our ability to understand short- and long-term changes in the labor market and economy, such as the dynamics of jobs, industries, and regions. The lack of access to timely and disaggregated data hurts the ability of state or local employer services staff to identify businesses that need technical assistance, which could prevent layoffs or spur job growth. It is also a barrier for local staff at a job center to access data to customize their outreach to specific populations of workers—such as veterans or workers impacted by a mass layoff event like the public health lockdowns—and prevent them from falling through the cracks.[3]

As policymakers debate how to fix our UI systems, it is important to situate UI benefits in the larger ecosystem of labor and education data systems, which suffer from many of the same root problems as UI benefit delivery.[4] Simply throwing billions of dollars at 53 separate systems over a short time frame will not address the root problems, as we learned from the previous effort to modernize UI after the Great Recession—only one out of five of those projects was completed on time, on budget, and with the required functionality.[5]

This report takes a closer look at what it will take to succeed. Although the framework offered here applies broadly to labor and education data systems, we focus on labor market information, employment, and training systems, such as those administered through the Workforce Innovation and Opportunity Act (WIOA).[6] The COVID-19 crisis offers a unique opportunity to hit the reset button on these systems and embark on a more holistic redesign guided by basic principles of continuous improvement grounded in user experience and improving equity in access. We convened three roundtables with 19 local workforce board leaders, state data systems experts, national civic technology experts, and other subject matter experts to inform this report on transforming labor and education data systems in the U.S.[7]

The first section of the report provides context to explain what the key elements of this ecosystem are and what functions the different systems play. We then outline four key problems: 1) misaligned culture and incentives to center the user experience; 2) procurement and data ownership challenges; 3) outdated policy and legal frameworks, as well as low capacity; and 4) gaps in coverage. The next section discusses lessons that the civic technology movement can bring to digital transformation efforts in labor and education systems. We then present case studies of existing efforts to improve labor and education data systems to identify approaches that could be supported and scaled. Subsequently, we articulate a vision to guide digital transformation efforts moving forward. We conclude with a set of policy recommendations.



THE KEY ELEMENTS AND PROBLEMS OF LABOR AND EDUCATION DATA SYSTEMS

In most states, the technology, administrative data, and processes for labor and education programs are highly fragmented by program or funding stream. States' internal legacy systems—as opposed to custom software systems procured from a third-party vendor—tend to be more than 30 years old and have become difficult and expensive to maintain, as exemplified by New Jersey Governor Phil Murphy's plea for COBOL programmers at the height of the UI applicant surge in 2020.[8] State data systems are also highly vulnerable to fraud and data breaches, and many states suffered from organized UI fraud incidents throughout the pandemic (despite having cumbersome detection processes in place, which create bottlenecks for getting relief out).[9,10]

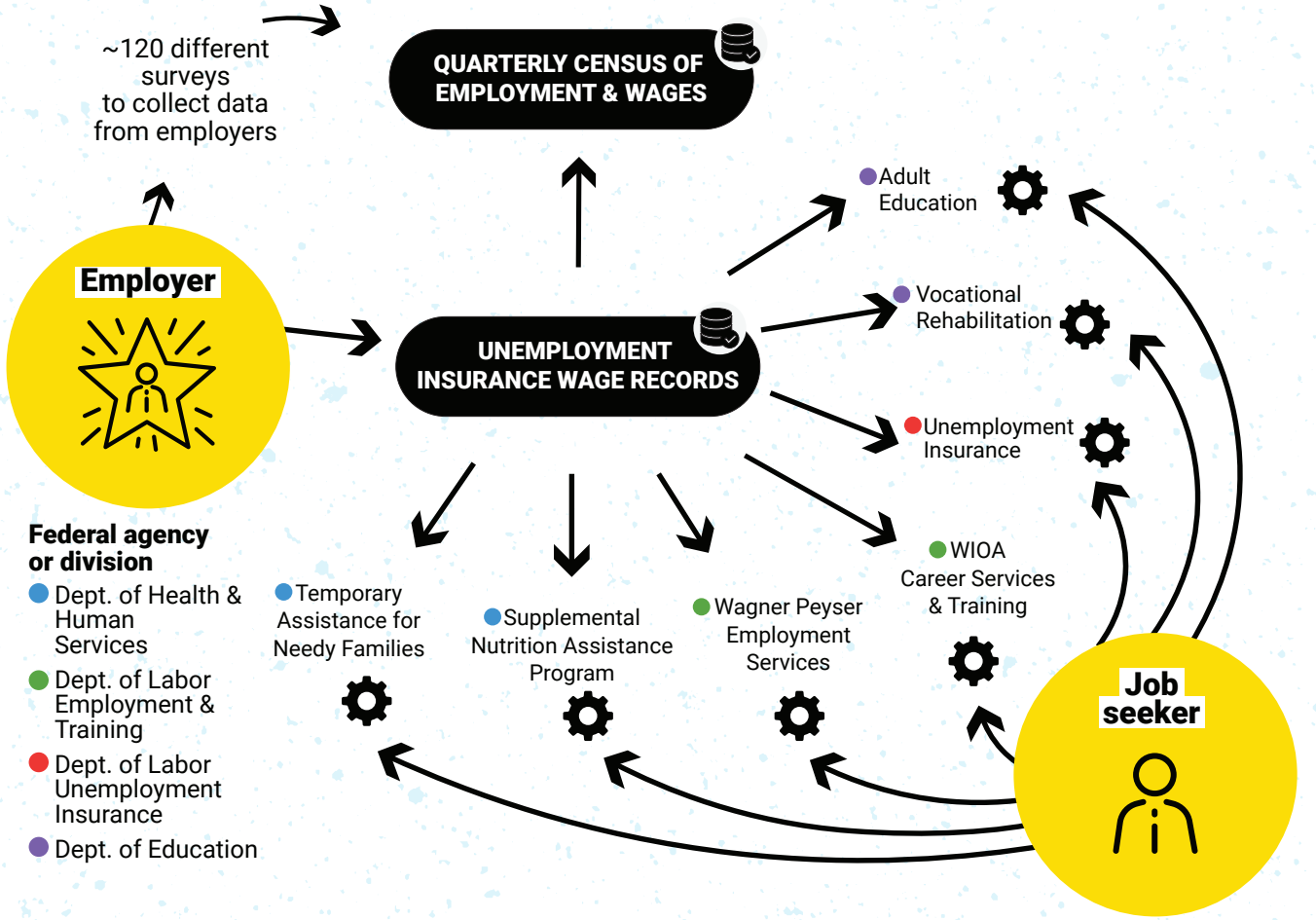
Nevertheless, this ecosystem is critical for the information it gathers about the labor market and how it is changing—also known as "labor market information."[11] UI wage records, a foundational part of the ecosystem, feed into the U.S. Bureau of Labor Statistics' Quarterly Census of Employment and Wages, and they are the primary data source for assessing the effectiveness of government-funded career, training, and education services. WIOA requires these programs to track the performance of participants to determine what share of them got a job, kept a job, and how much they are earning.

Career navigation systems are another key component of the labor and education ecosystem. These platforms help job seekers explore their career options, offering information about assessments, resume templates, job postings, or links to resources such as transportation. They also allow employers to post job descriptions, review resumes, and message candidates. However, the tools currently available vary widely across states and are not generally set up to maximize value for the end user, such as by offering options like chat bots for assistance, occupation-specific access to virtual networking opportunities, or aggregating job data from various other job boards.

Given the vast expansions to online learning and training opportunities in the private sector, these platforms also could be a valuable portal for directing people to quality tools and opportunities, such as bootcamps, that have demonstrated evidence of positive impacts and guidance to help people avoid providers that are fraudulent or misleading.

If designed to allow secure linkages, this ecosystem could hold an immense trove of data. For example, employers could more easily and more often report the required wage, hours, and earnings data in a semi-automated fashion. Such a system could also allow employers to request business services or notify state and local agencies when they lay off employees or reduce hours. Coordinated intake forms across programs and agencies could give users the option to share their information rather than having to visit multiple offices to fill out the same information on different intake forms. States or the federal government could build secure platforms for linking data that would allow a job seeker or a frontline staff person to see what other services the person may be eligible for or target messages to a specific population, which is especially relevant for supporting people with multiple barriers to employment or for small- and medium-sized employers that need specific types of support. A table of the key labor and education data systems in the WIOA ecosystem is in the Appendix.

Unemployment insurance data is used by multiple agencies and programs to verify employment and income



Source: Authors

Labor market information tells us how and where jobs are growing or declining, and helps us understand structural and cyclical changes happening to businesses, industries, workers, and job structures that may require policy attention. The more information labor market source data contains and the more frequently it is received, the more is known about jobs and the economy.

UI wage records form the backbone of this labor market information ecosystem, representing one of two main sources of data (the other being tax information, which is generally collected only on an annual basis).[12] Nationally, states do not capture accurate, consistent, and timely wage record information from employers. It typically takes six to nine months for the UI wage records to be reported, cleaned, and updated. Inconsistencies in how states collect UI wage record data from employers forced lawmakers to choose a flat UI benefits supplement in the CARES Act rather than a more precise percentage of previous wages, because some states did not have the data or in-house capabilities to calculate it.[13] Moreover, most states require employers (or their contractors) to report this information manually each quarter rather than being able to automate or semi-automate reporting from payroll.

Existing UI wage record data systems present at least two major problems for local program managers and training providers. Because it typically takes six to nine months for the UI wage record data to reflect in performance measures, it is hard for these programs to know how effective their programs are in time to be responsive. This is especially problematic during major economic shocks, such as the COVID-19 lockdowns. With the delays and often very aggregate-level labor market information from the state or federal government, local program managers typically have to make major program decisions in a data vacuum. For local program leaders, the exclusion of many types of workers in UI wage records also means that their performance outcomes are likely an undercount of earnings and employment, unless they purchase supplemental data such as private payroll data. This is why many local leaders feel the need to devote significant staff resources to tracking down participants after they exit the program to manually collect paystubs, which takes scarce staff time away from direct services to job seekers.

With the delays and often very aggregate-level labor market information from the state or federal government, local program managers typically have to make major program decisions in a data vacuum.

If we seek to avoid repeating wasteful investments in digital transformation, we must understand the root causes. This section offers a high-level framework to guide a more robust diagnosis of the problem.

1. A misaligned culture for fully utilizing data to prioritize program users' needs

We have identified three main problems with dominant mindsets and incentive structures in labor and education programs, which undermine the accessibility of programs and services for the end user.

First, labor and education systems prioritize risk mitigation, quantity-oriented performance metrics, and compliance over the needs and experiences of the end user. For example, anti-fraud measures historically have had top priority in UI benefits processes to prevent abuses, but during the pandemic surge in claims, many states tried to shift priorities to getting relief out faster and implement new processes for newly eligible populations under the CARES Act. However, existing anti-fraud measures were baked into the application process and led to major bottlenecks.

Even in normal times, education providers cannot easily gain access to UI wage record data from the

labor agency to comply with WIOA Eligible Training Provider List requirements. As a result, data-sharing agreements have taken years to complete, holding up progress on other aspects of the system, including gathering user experience information.

"[WIOA] is seven years old in June, and we haven't gotten past performance accountability," a state-level participant in our policy roundtable noted. "We haven't gotten past data cleaning. We haven't got past anything, which means we haven't gotten to the parts that really matter, which is the use of data to innovate what we do and ensure that the people who we're serving and the employers who we're serving are getting better results."

The institutional and legal setup puts state career staff and legal department staff in a position where they feel that they are taking on a high level of risk to their own career if they sign off on sharing data that later results in a data breach or improper use of the data. This is a strong incentive to delay and undermine data-sharing that would ultimately benefit the end user and program staff within the system, who could use the data to better meet the holistic needs of workers and learners regardless of which agency a given service is based in.

Local workforce development board staff in our roundtables reported that they have no way to know what other programs an individual is enrolled in or what other programs they may be eligible for, because the data is not linked, so all they can do is refer someone to a partner. From the end user's perspective, that means having to go to multiple offices and fill out numerous intake forms that collect the same information before the user can get the full array of support they are entitled to.

The second key problem with how technology and data management are institutionalized in labor and education programs is the lack of consistency in how states approach digital transformation and collect data elements. The lack of a shared blueprint slows down progress—such as implementing a grant-funded modernization effort—in some states more than others. Different programs and agencies collect the same data in different ways, which makes it challenging to link data even if it is shared.

UI was designed to be a state-federal partnership, and over time, states have become more assertive in exercising their authority to decide income requirements, benefit amounts, and benefit durations.[14,15] This has produced an uneven landscape of program rules and processes that makes it hard for Congress to pass legislation and implement reforms that are feasible across all states. The Commission on Evidence-Based Policymaking took some steps toward enhancing cross-agency coordination of data collection at the federal level in 2016, but according to our roundtable members, it did not go far enough.

Data dictionaries—which lay out the data objects, elements, definitions, validation, format, and other characteristics of a data system to improve consistency—are inconsistent across states, programs, and federal agencies.[16] The lack of consistency in data collection and validation procedures negatively impacts the end user experience and increases the overall level of effort required for data entry and data cleaning throughout the ecosystem.

"One of the problems that we see in unemployment insurance is the format of the data from one place to the other," a civic technologist who participated in the roundtable said. "Can you have a name of any length, short or long? Can your name have special characters? Can it have accents? Can it have non-Roman letters that would be able to be used by a QWERTY keyboard? How does it handle multiple names if it is a really common nickname? I was talking to a friend the other day, and her legal name is Guangcheng but she goes by Grace. All of her employers call her Grace and most of her files are as Grace, but her actual name is Guangcheng. So if she were to apply for unemployment insurance, that would probably break a bunch of things."

The use of different data dictionaries across federal agencies and programs impedes the ability of federal, state, and local area programs to link and align data systems. It also contributes to the proliferation of separate and duplicative intake forms, which has dire implications for equity in program access and user experience because it introduces several potential bottlenecks for the end user and diverts staff time away from direct service by necessitating duplicative data entry. Local workforce board leaders in our roundtables noted that even though they spend 30% to 50% of staff time on data reporting and compliance to achieve performance metrics, most do not have access to UI wage record data to inform how they deliver services or tell the story of their program's impact. Even if they do have access, the data is often too outdated or incomplete to provide useful analytics for program management, such as advising job seekers on jobs that are growing in the region.

Snapshot: The lack of national data standards undermines WIOA's customer-centered vision

One of the key objectives of the Workforce Innovation and Opportunity Act (WIOA) and subsequent federal guidance is, "To create a seamless, customer focused one stop delivery system that integrates service delivery across all programs and enhances access to the programs services."[17] The guidance explicitly recognizes that achieving this goal requires high-quality and integrated data that policymakers, job seekers, and employers can access. In addition, it specifically calls for coordinated intake and streamlined data entry as a priority for customer-focused service delivery and for the importance of informed consent for individuals to decide how their data is used and shared.

However, states have struggled to implement WIOA's vision because of legal and policy barriers. For example, one roundtable member reported that the six WIOA core programs have different rules for defining "entry" that shape how and when they collect information from the program user about the individual's barriers to employment. Even if a person applies for Department of Labor (DOL) workforce programs and Vocational Rehabilitation (under the Department of Education) on the same day, the data is collected differently. The DOL allowed for common definitions of program entry for the WIOA core programs under its jurisdiction, but the Department of Education's core programs (such as Vocational Rehabilitation) do not share them. The roundtable member reported that the state asked the Department of Education if they could share barrier questions from DOL program data to avoid re-asking the same questions, but the agency did not allow it. In effect, this prevents coordinated intake and streamlined data entry.

The lack of alignment at a federal level in how data elements are defined and captured creates multiple challenges down the chain of data systems and program processes. States continue to ask the end user for the same information multiple times, have staff re-enter data multiple times, and maintain duplicate data fields for different programs in their systems. When states create reports on program participation and co-enrollment, reports for programs show different counts for the same set of people. This creates confusion for researchers and other stakeholders who are trying to interpret the data to analyze program impact, and requires more training for staff and researchers to clarify how the data elements are created differently. It also requires that state IT staff set and maintain program-specific rules for automated data validation procedures rather than being able to work with one field across programs.

What should the federal government do?

At the federal level, a multi-agency task force should be established to develop a standard data dictionary and data management blueprint for a set of commonly collected data elements and shared rules around program entry and exit. This task force should include individuals with expertise in state-level data collection from the beginning, to be able to flag potential challenges with implementation. Having this shared underlying national structure for data across multiple federal agencies will reduce the administrative burdens on job seekers, employers, program staff, and other stakeholders. It will also increase transparency, improve data quality, and save public resources that are currently necessary for training, duplicative data validation procedures, and data management.

Moreover, the UI wage records, as a foundational data source for many uses, are onerous for employers to report every quarter. Changing how employers report wage record data has to be done carefully to preserve security for employers, while also getting their buy-in for a more automated and nationwide reporting process.[18] States collect UI wage records from employers differently. Because the data is often entered manually, these datasets tend to have data quality problems and are delayed in their release for six to nine months. With a handful of exceptions, state UI wage records data also does not have occupational information or information about employer-provided training that could inform policy or program decisions.

The third major problem that undermines user-centered design of labor and education programs is that the programs are not transparent to the end user. The COVID-19 economic crisis led to major changes in eligibility for many programs, which ultimately made the process for accessing programs even more confusing than it already was. For example, even before the pandemic, state formulas for determining UI eligibility and benefits amounts varied wildly and were opaque. The formulas are often difficult for program staff to understand—let alone a displaced worker who is experiencing high levels of anxiety and may be confused about what they are eligible for.

By creating three entirely new programs and relaxing rules such as work search, the CARES Act made this process even more challenging for end users to decipher because the rules were changing, information about them was scarce, and many workers were accessing UI for the first time.[19]

In addition, there are racial disparities in who is covered and who receives UI benefits.[20] In one survey, Black workers represented 16% of the unemployed, but only 9% received UI, and Latino or Hispanic workers represented 23% of the unemployed, but only 10% received UI.[21] This suggests that state UI programs reproduce historical patterns of racial and ethnic inequality either by design, through program implementation, or both.

The state formulas to qualify for unemployment insurance are not easy for workers to find or understand

Qualifying formulas:

AK $2,500 flat amount and wages in 2 quarters of BP, at least $250 outside HQ

DC 1½ x HQW in BP or within $70 of meeting the 1½ HQW requirement, $1,950 in 2 quarters, and 1,300 in 1 quarter

FL 1½ x HQW in BP; minimum of $3,400 in BP **HI** 26 x WBA in BP and wages in 2 quarters

IN 1½ x HQW totaling at least $2,500 in last 2 quarters; not less than $4,200

KY 1½ x HQW in BP, 8 x WBA in last 2 quarters of BP, $1,500 in a quarter

MA 30 x WBA in BP and $5,100 minimum in BP **NE** $4,324 in BP, $1,850 in HQ, $800 in another quarter

SC 1½ x HQW in BP and $4,455 BPW and $1,092 HQW **VA** $3,000 in 2 highest quarters of BP

VI 1½ x HQW in BP and $858 in HQ Alternative: $858 in HQW and 39 x WBA in BP

Source: U.S. Department of Labor, 2020.[22]

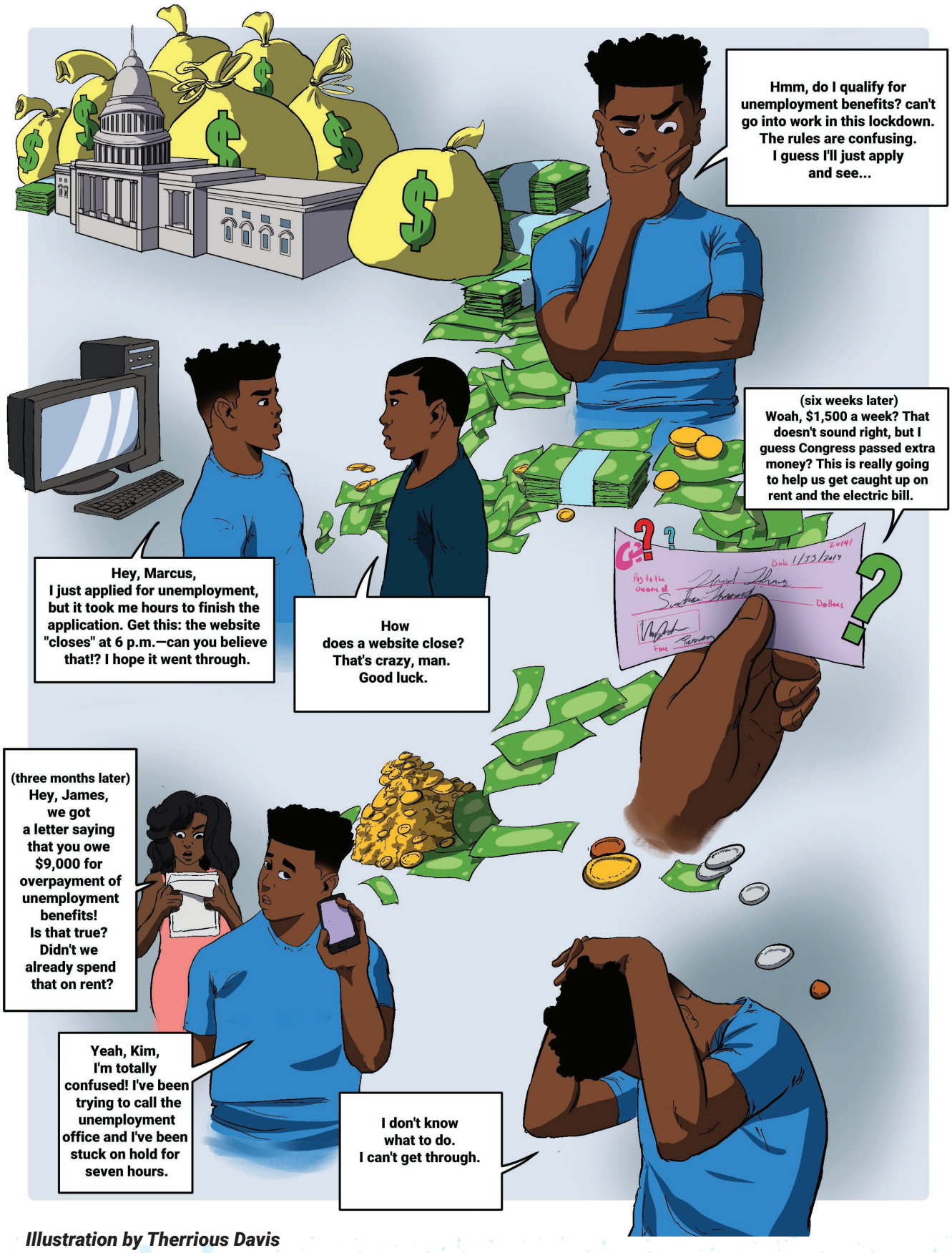


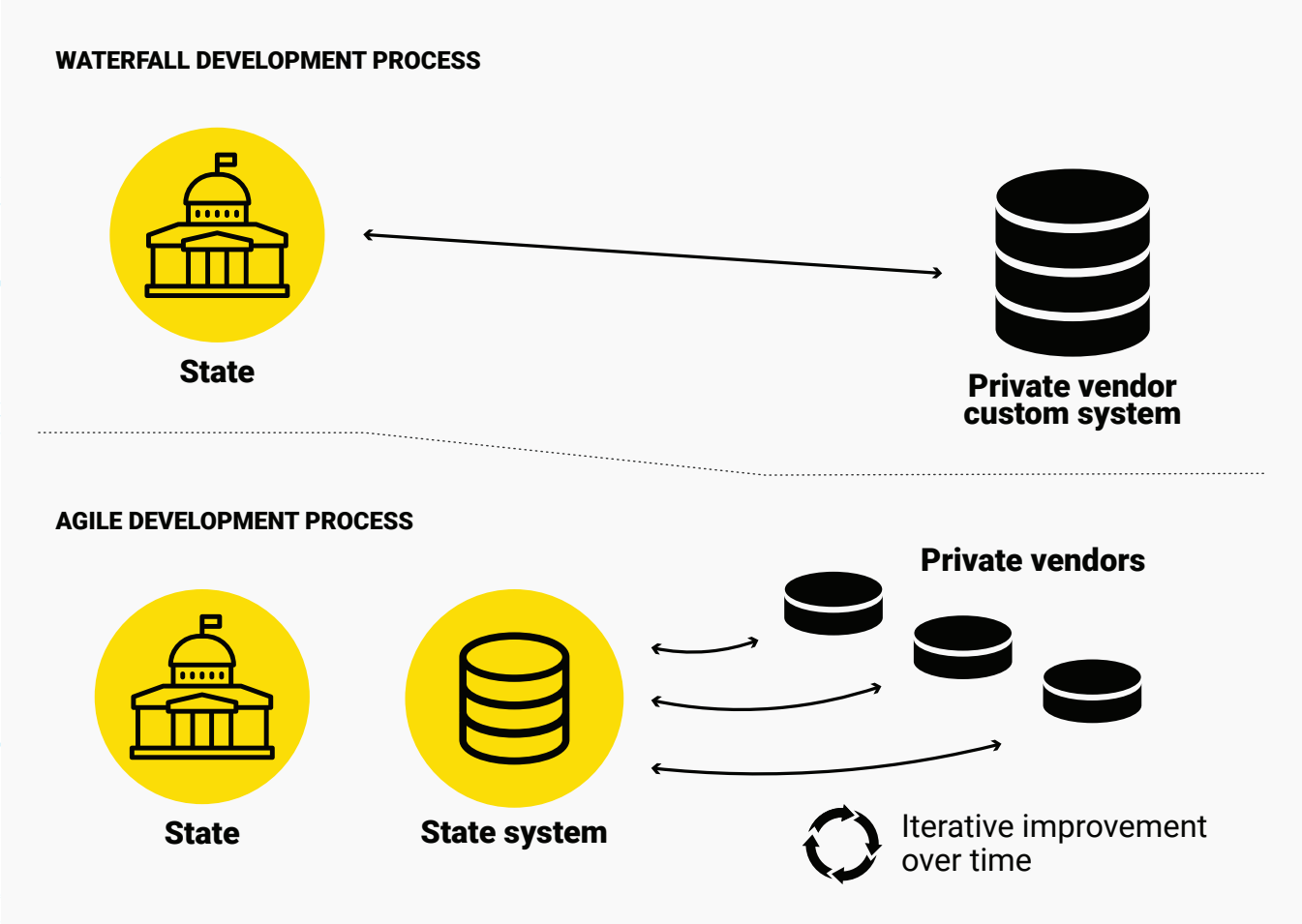
Illustration by Therrious Davis

2. Procurement, development, and ownership challenges

As states' internal resources for WIOA-funded programs have declined and many lack staff capacity to maintain and improve their legacy systems, states began outsourcing the development of management information systems by procuring wholesale custom systems from third-party vendors. Commonly known as "waterfall" software development, this approach to updating management information systems involves building an end-to-end custom system for the state, often based on an off-the-shelf template. These large-scale, multi-million dollar procurements can take many years to reach completion and have a high risk of failure, over-expenditures, and user experience challenges once they are rolled out due to their sheer complexity and limited opportunities to gather sufficient feedback from end users during the development process.[23] For example, Rhode Island's 2016 contract with Deloitte to streamline 15 legacy systems into a Unified Health Infrastructure Project (UHIP) for multiple programs ended in severe cost overruns, litigation, fines from the federal government, and 15,000-person backlogs for assistance.[24]

When states procure large-scale custom systems, they rarely do so with end user experience and equitable access as a priority. In fact, some states intentionally build them to be hard for end users to access, because that helps them replenish their UI trust funds—which were at very low levels in the years following the Great Recession of 2007 to 2009. The wide-ranging authority states have to set UI income eligibility, benefit amounts, and benefit durations translates, in practice, to a disincentive for states to make their systems easy to use, and there are few considerations for those with barriers such as limited English proficiency

Waterfall versus agile software development



or low digital literacy for accessing UI, even though it is an entitlement program.[25] The state of Florida is an egregious example of this practice; before the pandemic, the state contracted with Deloitte to overhaul their UI benefits system and deliberately requested a system that was designed to create barriers to accessing benefits.[26]

Another challenge with waterfall development is that states can get locked into a particular platform due to the high sunk costs of building a custom system that is compliant with a state's specific labor law and policies in an environment where there is very little consistency across states.[27] The federalist devolution of authority in UI and other labor systems to states creates an unsustainable need for each state to build a wholesale custom system rather than being able to achieve economies of scale and reduce costs by sharing system components or software services. The high cost of custom procurement means that it would be very costly to switch providers once the fundamentals of a platform or system are in place, essentially giving the third-party provider a monopoly and very little incentive to innovate or prioritize improving user experience.

Finally, many decisionmakers conceptualize digital transformation as just a technology change (hardware or software), rather than a more holistic transformation of the data, technology, policy, and processes to achieve specific goals. Even with the technology-focused approach, there is a tendency for policymakers to engage technologists late in the rulemaking process, which separates the substantive policy conversation about process reforms from the technological changes and data science solutions that can be utilized to support them. This often leads to major delays in implementation due to technical challenges that the legislation or guidance did not consider. Small changes to program performance metrics and reporting requirements are resource-intensive to implement because changes to them happen rule-by-rule and law-by-law without necessarily being rooted in an overarching data framework that embraces the full set of data and technologies available.

Despite the drawbacks of waterfall development, states continue to make these large, wholesale

The federalist devolution of authority in UI and other labor systems to states creates an unsustainable need for each state to build a wholesale custom system rather than being able to achieve economies of scale and reduce costs by sharing system components or software services.

procurements because they do not have enough resources or the right internal staff to do it themselves. In addition, many state leaders may elect to outsource system development so they can also outsource the risk of failure. However, recent high-profile failures seem to invalidate this perception, as many state leaders were harshly criticized for the outsourced systems. States also may choose a waterfall approach because of the challenges of getting authority to hire in time to meet grant deliverable timelines (such as in states where the legislature meets only once every other year) and federal limitations on spending funds within a two- or three-year time span. Another factor is institutional inertia in the full chain of contracting and development, as shifting to an agile approach (described below) requires adopting a different way of doing the work at each level.[28] Finally, there is a federal law from 1995 that limits the number of interviews that public servants (or contractors working for the government) can conduct with members of the general public to nine.[29] The only way to conduct more interviews with program participants for improving user experience is to obtain clearance from the Office of Management and Budget (OMB), which typically takes about a year.

Agile software development is an alternative approach that focuses on starting with small pilots, gathering extensive user experience input, learning from the testing, and then scaling the product or service once it is working well. Agile software development focuses holistically on continuous improvement of the policy, process, technology, user journey, and data management rather than on designing information systems alone. Research and evaluation are embedded in the development process, creating a culture of learning by doing, testing, tracking

metrics, and gathering feedback. The agile approach to process improvement is common in the private sector technology industry and draws from lean manufacturing methods popularized by Toyota. Agile methods have been widely adopted in the private sector and adapted to business-process re-engineering in the public and service sectors.[30] Adopting an agile approach does not necessarily mean that a state will develop everything in-house, but it does require that states have more internal expertise in several areas than they generally do now so that they can oversee the continuous improvement of their systems in the long run.

Still, agile software development can be challenging to adopt in the public sector for reasons such as:

- Private businesses can fail, but the public sector has to get it right or risk further declines in trust and political support for the system.
- The public sector has to be more accountable to compliance and is highly regulated because public resources are at stake, and public servants are strongly motivated by the need to be responsible stewards of public dollars.[31]
- Performance measures make it hard to pilot new approaches, because staff perceive a high risk of failure on metrics, which could lead to cuts in program funding.
- Legacy processes and rules may need to be rethought or removed. While onerous, many rules and processes were created for a valid reason, so staff may be hesitant to change them.

Although a growing number of public servants want to use agile methods, they often struggle to accommodate them within their existing administrative setup and organizational culture. They may be constrained by factors such as rigid procurement processes or budgeting rules designed for waterfall software development methods. Because agile methods disrupt routines of practice and assumptions, some public servants may also initially perceive them as a threat or a risk. In addition, local governments or providers that are closest to end users have the least funding and control over most data systems. Getting sufficient buy-in for innovative approaches from staff at multiple levels of an organization can take a long time, which limits the ability of local and state leaders to be responsive in a crisis.

For example, in fall 2020, a local workforce development board leader participating in our roundtables asked permission from their state agency to text UI claimants about job training and hiring opportunities based on information from their profiles that would indicate interest. They proposed an opt-out option so that claimants did not receive messages if they did not want them. The state engaged six high-level staff in discussions, and after several months there was still no formal approval. In April 2021, the local leader found out that several other workforce development boards in the state had been texting UI claimants for months, using data from their UI profiles. These other boards moved forward without the state's overt permission, opting to serve their community as best they could and taking the risk that they may violate a rule. As the board leader said, "When boards ask permission instead of forgiveness, the boards often lose as the state government can't keep up with rapidly changing circumstances. I don't know anyone who would say that texting folks about available services is technologically advanced anymore."

3. Outdated policy, outdated legal frameworks, and low capacity

In his campaign for president, Joe Biden signaled that he is committed to an overhaul of our legal and regulatory frameworks to bring data governance into the 21st century. Broadly speaking, this was to address a growing chorus of concerns about "big-tech" companies, as debates heat up about the lack of accountability for social media platforms and their impact on elections and social movements, data ownership rights of the individual to choose data-sharing preferences, racial bias and other ethical problems associated with the use of machine learning technologies, and the increased prevalence of security breaches such as recent ransomware attacks. Many privacy laws have not been updated since the 1970s—well before the age of mobile apps, cloud services, big data platforms, artificial intelligence, etc.[32]

"They've changed broad laws, but they have not touched any privacy law," one roundtable participant who administers state data systems said. "I work on downstream data systems, and I have to track about 10 laws that don't exactly work with each other. Part of the problem is that even though Congress made this broad statement that we have to use data to inform policy and research, they have hundreds of laws right now that restrict it."

The lack of a modern legal framework for protecting privacy and monitoring the ethical and moral use of data and new technologies is a major barrier to using agile, because it elevates the perception of risk associated with data-sharing among civil servants. Some of the ID verification vendors that states use rely on asking questions using data from either public records or data aggregators, which are available to ID thieves. High-profile incidents of ID theft and fraud, including in the UI program, have discouraged many government officials from authorizing data-sharing due to fears that the data will be misused. New America recently published a report analyzing possible strategies to regulate and enforce data rights in the U.S.[33] The real cost of failing to develop an adequate governance framework for data rights, security, and privacy will come in the form of escalating long-term risks of data breaches and further erosion of trust in government.

The high cost of maintaining 53 separate systems and processes in labor and education programs—combined with long-term underinvestment in state-run legacy systems—has contributed to the widespread use of antiquated technology, processes, and data collection methods, as well as third-party custom systems that states have limited ownership of. States are often inclined to save funds for upgrades rather than spending them if they are uncertain about the availability of future funding or are concerned that major upgrades can take attention away from already underfunded direct services. The federal government has attempted to push modernization of these systems for more than 10 years. For example, the National Association of State Workforce Agencies (NASWA) UI Information Technology Support Center has played a key role in providing technical support to states modernizing their UI benefits and tax systems, including efforts to help states respond to the COVID-19 crisis. However, the most current data they report indicates that fewer than half of states have completed modernization of their systems.[34]

Decisionmakers sometimes also make the flawed assumption that digitization is always better than manual processes, or that the root cause of a problem is the technology when it is actually a problem with the process. For example, in their book "Power to the Public," Tara Dawson McGuinness and Hana Schank describe a unified benefits form in Michigan that had more than 1,200 questions, took many people two hours to complete, and used up valuable staff time to process each application.[35] Simply moving that form from paper to online would not necessarily make it better. It took an intensive eight-month redesign process that involved policy experts from multiple programs, interviews with applicants, and user testing before Michigan was ready to roll out a new form that was 80% shorter. What matters most is not whether the solution is electronic or automated, per se; the key is having a clear idea of what would make the process better and for whom.[36]

In addition, many states and local areas lack capacity to recruit, train, and retain staff at competitive salaries for key roles such as designers, data analysts, software engineers, cybersecurity experts, and business analysts (people who understand both the technology and the policy side). One of the value propositions of the public workforce system

is to provide real-time intelligence to workers and employers about what is happening in the labor market, but with incomplete and flawed data from the UI system and limited expertise to analyze the data, the public workforce system is hobbled. Building capacity for continuous improvement and incorporating ongoing input from end users require competencies, skills, and experience that most states and local areas do not have internally. Additionally, like the private sector, public sector programs struggle with demographic shifts in their workforce, with a large share of older workers likely to retire in the next five to 10 years and a limited pipeline of younger managers, technologists, and workers to replace them.[37]

Finally, the infrastructure and fragmented setup have significant implications for measuring and assessing equity across programs, such as being able to understand whether a given state or local area is making equitable decisions about enrollment.[38]

In some states, technology (or the "IT department") is treated as an afterthought or supportive service rather than as an integrated part of the process. In many cases, roles such as designers who focus on user experience or business analysts who translate between technologists and policy staff are nonexistent, and there are few data scientists in government positions who understand data analytics, machine learning, etc.

"If you bring the technologists in at the front side, at the state, local, tribal, and federal levels, and have the policies and the technology work in partnership to say how do we do this efficiently, they might actually be able to find tradeoffs right away that would make it easier for all of our systems," a roundtable participant from a state workforce agency said. The problem is often also a cultural disconnect, in the sense that technology staff and program decisionmakers tend to speak different languages, so it is hard for each party to understand the technical details of what the other needs.

Although the first instinct when a system fails may be to infuse a round of time-limited modernization funding to each of the 53 states and territories, previous rounds of one-off investment suggests that this is not a wise approach—especially when the program leadership and career staff are not engaged as partners.[39] A large, one-time infusion of funds is unlikely to address the root problems and may engender further mistrust in government. Large-scale, one-time efforts deployed over a short time horizon (e.g., two years) also make it harder to leverage existing knowledge and assets that can be scaled—typically these are the prototypes that have already been through a long process of iteration. We need to reimagine and rebuild these systems, aiming at continuous improvement over the long run.

4. Coverage gaps in UI wage records

There are serious gaps in coverage in the labor and education data collected through UI wage records.[40] Congress designed UI wage records for the purpose of administering UI, which excluded many categories of workers, such as self-employed individuals, agricultural workers, or freelancers. UI wage records were never designed to be used for a wide range of other purposes beyond UI administration, such as a required data source for measuring performance of WIOA-funded programs. Collecting up-to-date information about non-waged labor is challenging due to the instability of the income that is common in freelancing and gig work, and the best source is currently tax data that only comes out once per year. It is also a challenge to figure out who should pay taxes to pay into the UI trust fund on behalf of workers who are not employees, and the misclassification of workers as independent contractors in many states complicates this problem.

Because of this, there is little information to assess what happened during the pandemic to gig workers, self-employed individuals, and others not covered in the UI wage records. It is also challenging to measure trends in non-waged work arrangements with the data currently available.[41] Because this data is the main source for assessing state and local performance of workforce programs, not including these workers in the primary source dataset is likely generating a vast underrepresentation of participant outcomes and also serving as a disincentive for program staff to enroll anyone who is interested in self-employment, gig work, or entrepreneurship in services from our publicly funded workforce programs.[42]

Few states capture occupation of employment in UI wage records, which would show whether someone was employed in the same occupation that they were trained for and demonstrate occupational level shifts in employment at a participant level. Additionally, few states gather data on employer-based training and learning activities, so it's impossible to assess whether or how the private sector is training employees or how to target public training services based on data analytics that can provide intelligence about what types of investments are likely to be impactful.[43]

WHAT CAN A CIVIC TECHNOLOGY APPROACH BRING TO THE TABLE?

"Civic tech is a loosely integrated movement that brings the strengths of the private sector tech world (it's people, methods, or actual technology) to public entities with the aim of making government more responsive, efficient, modern, and more just."

—Cyd Harrell, "A Civic Technologist's Practice Guide"

The civic technology movement is rooted in the notion that transparency and accountability in government are key principles for maintaining an effective democracy. As McGuinness and Schank elaborate in "Power to the Public," this ethic rose to prominence in the early postwar period with open government initiatives.[44] Today, the civic tech movement is largely focused on using digital infrastructure to make government services and processes (what Cyd Harrell calls "public digital goods")[45] as good as private tech products and services through collaborative partnerships with civil service staff. It is also concerned with getting more value out of the collected data—both inside and outside government—because broken data and information systems exacerbate unequal access to information and pose a threat to our democracy.[46]

Although open government and open data can go hand-in-hand, Harlan Yu and David G. Robinson highlight the dangers of assuming that open data or code (the technology side) necessarily translates into open government (the transparency of government policies and processes).[47]

In the U.S., the civic tech movement remained a decentralized, community-based movement with several organizations hosting hackathons or launching volunteer "brigades" to work on solving specific challenges. However, when President Barack Obama signed the Affordable Care Act into law and several states launched health care exchanges that crashed, it spurred a rush of technologists from the private sector to volunteer to help fix them on a larger scale.

During the Obama administration, civic tech became more institutionalized through the creation of the U.S. Digital Service and 18F, two federal programs that provide support to federal agencies through temporary assignments to transform a specific area of work. Many countries, U.S. states, and cities have also begun to institutionalize civic tech by establishing digital innovation teams. For example, Chicago created the first chief data officer, soon followed by New York and Los Angeles.[48] In addition, several private consulting, philanthropic, and nonprofit organizations have paved the way for government partners at multiple levels to improve their services with user-centered design, such as Code for America's work on GetCalFresh, a mobile app for accessing food assistance benefits in California.

Despite this surge of activity and pilots at all level of government, civic tech has faced barriers to becoming more deeply institutionalized and influential in government, and most programs and policies are still designed without a deeply embedded user-centered approach. One challenge is that there are limited resources to support cross-sector learning, which civic tech relies on. Additionally, although the movement has matured, it continues to struggle with the "tech savior complex"—a form of hubris that many technologists enter government with that falsely assumes that a given problem can be solved with tech or tech expertise alone, as opposed to an approach that strategically emphasizes partnership, co-design, and buy-in. This contributes to a broader cultural disconnect between the types of environments technologists are accustomed to working in and civil service environments.

Third, like tech sector more broadly, the civic tech movement is disproportionately made up of people who come from privileged backgrounds and are unlikely to understand the struggles of a given program's end users, whose lived experiences are vastly different from their own. This effects the quality, range, and accessibility of the resulting prototypes and solutions.

Finally, on the government side, institutional inertia, limited staff awareness or familiarity with new technologies, resource scarcity, incentives structures that reward compliance rather than "risky" innovations, and the responsibility to steward resources carefully have historically slowed innovation in government (sometimes for valid reasons).[49] Now that more public sector leaders have bought into it, everyone seems to want digital transformation immediately, but the lack of resources and the lack of an overarching data and security framework are barriers to public sector deployment of new technologies such as machine learning, cloud services, or data science.

Now that more public sector leaders have bought into it, everyone seems to want digital transformation immediately, but the lack of resources and the lack of an overarching data and security framework are barriers to public sector deployment of new technologies such as machine learning, cloud services, or data science.

Snapshot: What can the U.S. learn from other countries?

How a government creates and uses digital public assets is always embedded in the particular institutional and legal framework of a given country. The U.S. can gain fresh ideas about how to deploy new technologies and processes by stepping out of our own institutional context to explore what other countries are doing.

The U.K. digital service. The U.K. created its first national digital service, the Government Digital Service (GDS), in 2011. GDS creates public digital assets that can be shared with local and national programs to streamline and support their operations.[50] For example, GDS teams can create a template for an intake form and then deploy it to local program offices through cloud services. This reduces the duplication of effort, streamlines data collection methods to increase consistency and quality of data, and offers the opportunity to improve accessibility for end users on a large scale quickly. In 2020, GDS published its Government Functional Standards, a guide that outlines a government-wide set of operational principles around technology for nontechnical leadership, including prioritizing end user needs, using shareable and adaptable open standards, and employing agile systems development approaches.[51]

Estonia's capabilities and COVID-19 responsiveness. Prior to the COVID-19 pandemic, the Estonian government had built one of the most sophisticated online government service delivery systems in the world, known e-Estonia. All citizens are issued a digital ID, which can be used to securely access government services such as voting and submitting taxes—an investment that paid off during the pandemic.[52] Estonia also developed a data exchange tool called X-Road, which facilitates fast and secure data exchange between various governmental agencies and organizations.[53] As lockdowns began, Estonians were able to complete an estimated 99% of government services online, significantly minimizing service disruptions.[54] In addition, the government and startup community supported an initiative called Hack-the-Crisis, an online hackathon for Estonians to find solutions for slowing the spread of COVID-19.[55]

South Korea's labor market information systems. South Korea has developed sophisticated labor market information systems to inform the government's efforts to prepare citizens and businesses for rapidly changing technologies. The Korean Labor Market Information System enables government officials to generate and analyze big data through machine learning technologies to improve job matching between job seekers and employers. A job training portal also offers users targeted information about learning opportunities that are relevant to their background and interests. Their equivalent of UI is integrated into the same platform, so firms and individuals can easily access information about work history or training and a history of employer contributions to insurance.[56]

THE ROLE OF DIGITAL SERVICE TEAMS IN A CRISIS

Although civic tech leaders previously had a limited history of engagement with labor and education programs, during the COVID-19 pandemic, they played a pivotal role in helping many states stand up new UI programs quickly, often by complementing rather than replacing old systems. For example, civic tech leaders helped states figure out how to make sure that the "front door" to services was not crashing from overload; they also automated some aspects of communication with applicants, including a way for applicants to reset their password without having to call in and speak with a person.

However, the sheer confusion that ensued as states were trying to change their systems to implement CARES Act changes while also serving an unprecedented number of claimants exposed several states to major instances of benefits fraud. Developing a continuous improvement approach to data and technology would make these interlinked systems far more resilient and scalable in a crisis and will likely reduce the risk of fraud and confusion at the same time.

There are early indications that the federal government is reinvigorating its role in digital transformation in the wake of the COVID-19 crisis and 2020 election. President Biden has signaled that digital transformation is highly valued in his administration, with several leading technologists on his transition team and some key appointments of civic technology leaders to federal agencies, such as Rebecca Piazza from Nava.[57] In addition, Sen. Ron Wyden (D-Ore.), chair of the Senate Finance Committee, has two technologists on his staff and, as of this writing, he has introduced legislation for UI modernization and state and local digital services teams.[58] This proposed legislation is promising because it builds on many of the principles of civic tech discussed in this report.[59]

As the Biden administration and Congress begin working in earnest to advance legislation that will support improved service delivery through digital transformation, the labor and education ecosystem is top of mind because utter chaos still lingers on in many state UI delivery systems. Helpfully, there are existing efforts that federal and state leaders can build on and learn from, some of which are profiled in the case studies below.

EXISTING EFFORTS TO INNOVATE AND IMPROVE DATA SYSTEMS IN LABOR AND EDUCATION

This section contains several case studies to illustrate how federal, state, and local policymakers have creatively and effectively tackled some of the challenges to digital modernization outlined above. The case studies also highlight remaining barriers facing such efforts that further policy change could address. As the appendix in this report demonstrates, there is an abundance of existing initiatives to transform digital infrastructure in the labor and education ecosystem in the U.S., but the coordination across them is low. The selected cases shed light on a handful of such efforts and were selected to show a variety of potentially scalable approaches within different levels of government, across agencies, and across state borders.

JEDx: An opportunity to enhance and improve jobs and employment data

The Jobs and Employment Data Exchange (JEDx) is a public-private initiative from the U.S. Chamber of Commerce Foundation that seeks to modernize America's workforce data, starting with UI reporting and enhanced UI wage records.[60] The U.S. has two comprehensive sources of earnings and hours data: one from the IRS tax records and the second from UI wage records that employers are required to report quarterly.[61] In general, annual IRS tax records data are not frequent enough to provide actionable labor market information, so UI wage records form the backbone of labor market information infrastructure in the U.S. for labor market research, program performance, and calculating eligibility for UI and other programs.

However, as noted earlier, UI wage records are problematic in many respects. They exclude several categories of workers; employers report their data only once per quarter (typically in a manual format that is error prone) and employers find the reporting process onerous in many states; and states do not collect consistent data, making it hard to rapidly implement nationwide changes to programs in a crisis and requiring employers with locations in multiple states to set up multiple processes for reporting. Finally, despite the fact that this data is required for documenting performance across multiple agencies and programs, data-sharing agreements to gain access to UI wage records can take years, and the data suffers from quality problems and delays.

Launched in March 2021, JEDx brings together state workforce agencies, chambers of commerce, six federal agencies, philanthropic leaders, and private sector leaders from firms such as IBM, Indeed, and the National Student Clearinghouse.[62] The initiative was motivated by a growing need across multiple stakeholders—including private sector employers, federal and state agencies, and researchers—to make the process in which employers report employee earnings to the state better by reducing reporting burden, improving data quality, and expanding the capacity for evidence-based decision making with more real-time access to high-quality labor market information.

The T3 Innovation Network partnered with the HR Open Standards Consortium (HR Open) to develop public-private open data standards for employment and earnings records. JEDx builds on the T3 Innovation Network's project on public-private data standards for employment and earnings records, which could be integrated into employers' HR systems for more efficient collection, management, and reporting of earnings and hours information and adopted by employers and government agencies. The standards include a data dictionary of over 200 data elements, which was co-developed by employers, HR technology providers, and federal and state agencies. It also enables employers to automate wage record reporting as part of their normal payroll reporting process, while continuing to meet and even exceed state reporting requirements. JEDx estimates that these standards could be applied to at least 120 state and federal surveys, reducing the reporting burden on employers and improving the quality and frequency of government labor market data.[63]

Federal and state leaders could build on JEDx's work by shifting to a multiple purpose data collection platform that is semi-automated, rather than collecting data in a more static way through multiple single use streams. Having employer support for it from the beginning is also key for making this modernization effort politically viable.

Implementing a new platform would require adoption of standardized data dictionaries across existing surveys, which could introduce political challenges in terms of getting states with different requirements to agree to implement it. However, in long run, switching to this model can benefit states by increasing the share of UI benefits applications that are initiated by employers, which would vastly reduce the effort, administrative burden, and equity challenges that states face because they are so dependent on employee-initiated claims filing in their current systems. It could also help states reduce fraudulent claims.

As with any initiative involving data systems, scaling this approach would require careful attention to the regulatory and enforcement mechanisms required to safeguard ethical data use and privacy protections.

The Midwest Collaborative: A cross-state initiative to share data and practices

The Midwest Collaborative is a coalition of workforce and education agencies from nine states that seeks to advance the capacity for evidence-based decisionmaking through interstate and interagency data integration and knowledge-sharing.[64] Established in 2018, the Midwest Collaborative is convened by the Coleridge Initiative, a nonprofit organization dedicated to helping governments use data to inform policy.[65] The initiative was developed in response to growing interest among state agencies and university researchers across the Midwest in developing a more regional approach to policy evaluation.

The Midwest Collaborative has allowed states to work together to enhance their capacity for in-house data analysis. In response to COVID-19's unemployment crisis, the collaborative developed a prototype for a user-friendly dashboard displaying data on unemployment, piloted in Illinois. The dashboard shows near-real-time data on UI claimants, which can be disaggregated by variables including geography, industry, and educational attainment. American Job Center staff are able to access this dashboard to better understand who their claimants are, helping them think through the skills claimants have that could be transferrable to other sectors. Because the portal was developed using open-source code, several other states in the Midwest were able to replicate the dashboard and adapt it to their needs.[66]

The Midwest Collaborative's partnership has also enabled workforce leaders to share data to develop regional strategies. Microdata from several Midwestern states is housed in the Administrative Data Research Facility (ADRF), a secure, cloud-based platform that allows approved researchers and government officials access to confidential datasets.[67] Through the ADRF, states have control over their own data but are also able to share it with researchers or other states. This secure data-sharing can facilitate greater regional collaboration. For example, Illinois and Missouri, which both house data in the ADRF, have been able to analyze unemployment patterns in their border region, where workers often live in one state but work in the other. As this data is also used to assess program performance, it also allows programs in the region the ability to more accurately capture their outcomes even if someone moved to another state for work.[68] One roundtable participant identified the need for more laboratory-like environments like the ADRF, citing the important role it plays in states' "organizing around problems and co-creating solutions across different jurisdictions to reduce cost and scale solutions."

While the Midwest Collaborative has made significant progress, federal and state privacy and data-sharing laws continue to be a barrier to more integrated data-sharing between states. For example, privacy laws typically restrict external data-sharing to aggregate data and prohibit individual-level data from being shared, complicating efforts to integrate data across state lines. In addition, the maze of relevant privacy laws at the federal and state levels is complex and requires significant expertise to ensure compliance. Local areas are particularly limited in accessing data and have not consistently been engaged in efforts to improve data-sharing and usage, despite their role on the frontlines serving job seekers.

Vermont's state-level initiative to securely link and share data across programs

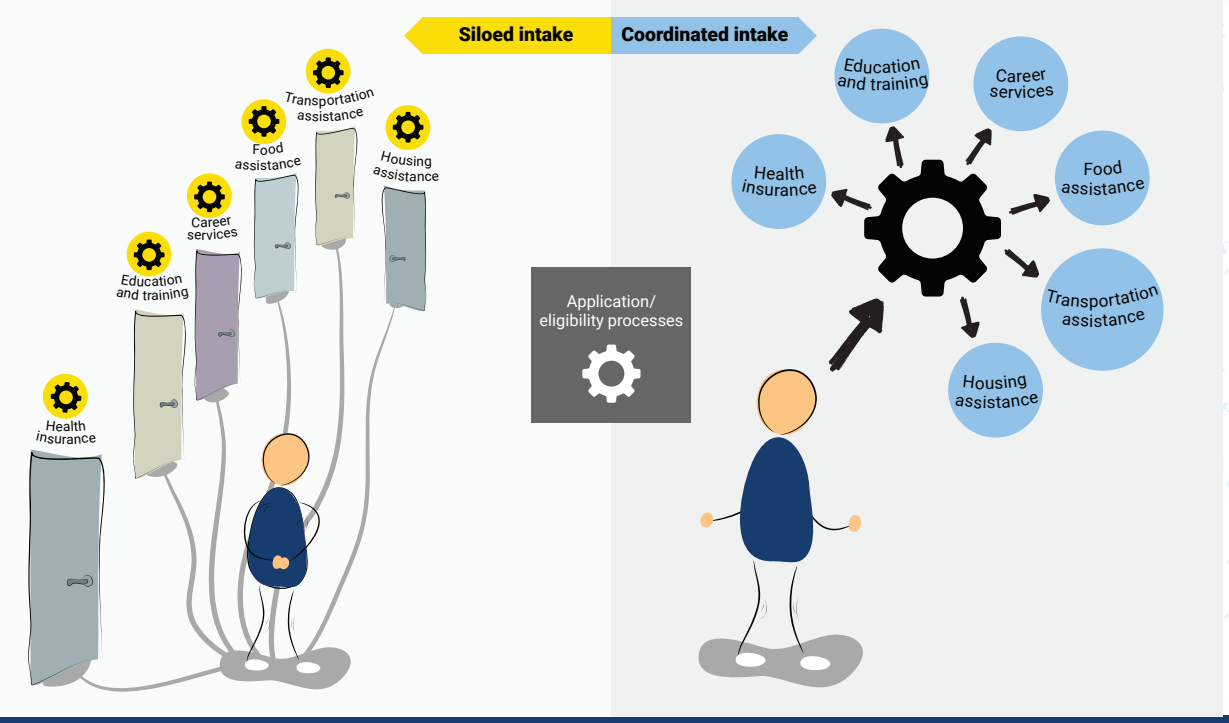
The Vermont integrated online benefits application is a state-led project that seeks to streamline the process of applying for 37 health care and financial benefit programs across the state. The application was designed by the public benefit corporation Nava, in partnership with the Center on Budget and Policy Priorities, Code for America, and Civilia.[69,70]

Individuals applying for public benefits are often eligible for multiple programs, but applications are typically not linked, requiring applicants to submit the same information multiple times to different agencies. Seeking to address this problem, the integrated online benefits application allows applicants to securely submit documentation for multiple programs through a single user-friendly platform that can be accessed from a phone. The application also simplified work processes for staff by making documents immediately available, shortening the process time for each application.

The state of Vermont developed the integrated online benefits application through a modular contracting strategy, breaking the project into 12 smaller pieces rather than attempting a single costly, large-scale systems overhaul. The vendor, Nava, was then tasked with completing each module one at a time, beginning with those modules designated as most important to customer and employee satisfaction. This strategy posed less risk in the event that the new technology did not operate as planned, as Vermont had seen with the state's health insurance marketplace, Vermont Health Connect. A modular approach also facilitated faster adoption of specific tools as they were completed. For example, Nava completed the first module—a document uploader tool for Agency of Human Services programs—in just four weeks. The following elements were also critical to the project's success:

- Human-centered design that incorporated feedback from both applicants and staff.
- Open-source code that could be easily adopted by multiple agencies across the state and updated as needs evolve.
- Capacity-building training for staff, ensuring in-house technologists were comfortable with the new software and could make changes easily without needing to consult the vendor about every update.[71,72]

A lack of standardization of required data among public benefits programs remains a barrier to simplifying the application process in Vermont. All states are subject to federal requirements around data collection for each benefits program and often choose to add their own customized data elements. These eligibility and data collection requirements differ between programs, which complicates efforts to consolidate applications.



Case study

Rhode Island's cloud-based solutions for rapid response to policy changes

The Rhode Island Department of Labor and Training (DLT) was concerned about the surge of UI claimants overloading their 40-year old legacy system during COVID-19 lockdown.[73] The state partnered with Research Improving People's Lives (RIPL)[74] to lead a collaborative project to find a solution.

Like most states, Rhode Island's legacy systems were developed before the Internet, so when COVID-19 lockdowns began, the systems could not handle a large-scale surge in applications for UI benefits.[75] Despite having this legacy system still in place, Rhode Island became the first state in the country to implement a claims filing process for Pandemic Unemployment Assistance (PUA) claims, one of three new programs that Congress created under the CARES Act to extend UI to workers who were ineligible for UI before the pandemic.[76]

Rather than procuring a custom solution, the Rhode Island team decided to implement Amazon Connect, a managed cloud services platform that uses Amazon Web Services (AWS) to set up a cloud-based call center. Planned and implemented in just 10 days, the new call system allowed DLT to handle up to 2,000 calls at once. When capacity was reached, DLT staff were also able to access data on how many individuals attempted to call but were unable to get through.[77]

Because PUA claimants are missing from the UI wage records (which are normally used to verify earnings and other information), each state needed a new process to securely collect, store, process, and verify PUA applicant information through tax records. To build this, RIPL and AWS developed a cloud-based process that included the following elements:

- An open-source form-building library, Trippeto, that allowed sensitive data to be stored securely in compliance with relevant privacy laws.
- Agile software development that could easily respond to ongoing regulatory and operational changes.
- An automated process for notifying claimants of errors in their applications, reducing the time staff spent manually processing applications.
- Technology from the American Bankers Association that verified bank routing numbers during processing to ensure submissions were error-free.
- An automated verification system that used claimants' tax records to confirm the income submitted on their applications was accurate.[78]

The difficulty of sharing data between agencies remains a barrier to implementing innovative solutions like Rhode Island's. Because data privacy laws forbid sharing claimants' tax records with another state agency, RIPL and AWS needed to develop a second cloud-based system hosted by the state's Division of Taxation to house the PUA income verification process. While this was a clever workaround to data-sharing challenges, policymakers can make this process easier by allowing for greater data-sharing between agencies, so long as appropriate security measures are established.

THE VISION: LABOR AND EDUCATION SYSTEMS AS A 'LIVING RESOURCE'

There is a growing sense of political urgency to fix UI, but making a large one-time investment in 53 separate state systems without a national framework or conversation about data use and ownership could backfire.

History tells us the one-off approach is expensive and carries a high risk of failure. With a rapidly changing landscape, we need holistic solutions that do not require passing new legislation each time something new comes up, and it is not functional for states to wait five to 10 years for a third-party provider to develop a custom system, only to learn it is outdated by the time it is released. If we do not integrate digital transformation and user experience into the everyday process of administration at multiple levels of government, we risk further undermining trust in government and faith that our democratic institutions can adequately respond to citizens' needs.

We can draw from the case studies above to sketch out a vision for a better way to approach digital transformation in labor and education systems.

A collaborative effort with clearly defined scope. Each initiative involved a multi-stakeholder partnership focused on addressing a problem with a clearly defined scope. Each initiative sought to increase the quantity, quality, and frequency of data collected at scale, with less manual entry needed for staff and end users. The initiatives were not top-down or highly centralized, but one organization "owned" it by playing an intermediary role in convening the partners across agencies, states, programs, expertise, or sectors (public/private) to solve the problem. The most successful initiatives started small and then iteratively scaled up with clear opportunities for user feedback and input from stakeholders along the way.

A holistic focus on data, technology, use cases, and process design. The initiatives were holistic in terms of addressing the process, technology, policy barriers, and data at the same time. The goal was not necessarily to automate or digitize everything—it was to make the process better overall and easier to use based on the original goal.

The need for a national blueprint and schema to facilitate secure data-sharing and linking. Each case study highlighted long-standing barriers to data-sharing across programs, funding streams, states, and federal agencies. Although the initiatives came up with creative workarounds, in the long run, the cumulative effect of workarounds can bog down processes with unnecessary complexity while not necessarily making the process more secure. A common data dictionary across programs and agencies is a big-picture imperative to truly achieve digital transformation goals. This would build on the Foundations for Evidence-Based Policymaking Act of 2018,[79] facilitate adoption of common intake forms, and reduce the risk of lock-in for states when they procure custom systems by maintaining a common set of data elements and definitions across systems.

Cascading technological infrastructure allows data use for multiple purposes and research questions. New technologies, data collection and management platforms, and continuous improvement methods offer new opportunities to build decentralized ecosystems that are based on a common blueprint and enable secure sharing. States typically house their data in-house by program, and any sharing occurs by establishing a data-sharing agreement, which often takes years to finalize. Cloud-based technologies and data trusts allow for an administrative structure that is distributed but structured around a consistent set of data, programmatic, and security standards. It allows civil servants at different levels of government more access to the data they need, while establishing tiered access permissions and automated links between data systems to reduce security and privacy risks. It also could allow employers, job seekers, and other end users to see their own personal data and access better information about the labor market—in some cases, data that can be catered to their unique background and needs. This combination of consistency and flexibility has potential to increase the frequency, security, and quality of the information that is collected and incentivize innovation and better use of data to generate value for the end user while also reducing the culture of fear around sharing data.

Expertise in user-centered design and agile methods in a government context. Subject matter experts with experience in user-centered product design in the private and public sector technology environments played an integral role in several case studies. For example, the lead organizations that supported states in their early response to COVID-19 and the CARES Act changes had experienced staff who had been involved with supporting the health care exchange rollouts or had worked at either 18F or the U.S. Digital Service. Many states do not have enough staff with this expertise in-house, although that is starting to change.

The need for an updated framework to govern privacy and security. Ensuring individual rights to privacy and minimizing fraud and security risks has grown more challenging and costly over time. States had to stand up the PUA program quickly, and the rushed implementation and lack of source data to verify earnings for self-employed and gig workers created new vulnerabilities to fraud. Although existing privacy laws are in place for a valid reason, many of them are contradictory and obsolete, and they caused several of the initiatives in the case studies to develop workarounds that, arguably, are not an optimal solution.

SITUATING THE DATA SYSTEMS AND PROCESSES IN THE BROADER CONTEXT OF UNEMPLOYMENT REFORM

Before offering recommendations related to data systems and processes, we want to acknowledge the larger policy debates over improving the UI program. For years, experts have argued that the overall UI program needs serious reform to reduce inequities in how states administer UI and rebalance the authority between state and federal governments.[80] Under the existing program, states have a high level of authority over how they administer UI. Many experts argue that changing the balance of power between the state and federal government would secure a more sustainable financing structure, more consistent and equitable access to benefits, and an improved process of benefits distribution.[81,82,83] For example, two recent policy proposals advocate for a nationally administered program and system, including a range of options, from full federal administration through the Social Security Administration to state administration with national standards to limit variation across states.[84,85]

We agree with most experts that the UI program requires broader reforms to shore up the safety net for a wider range of unemployed workers in the modern economy and effectively keep aggregate consumer demand stable in an economic crisis with automatic triggers. Furthermore, we agree that a stronger role for the federal government in ensuring the program is more consistent across states is necessary. Increased authority for the federal government would be greatly beneficial for streamlining intake across programs, reducing risk of vendor lock-in, distributing multistate software services, creating responsive policy in an emergency, and linking data securely across more states and programs.

However, total federal control over administration of UI is not necessarily the best solution. It will be politically challenging to make such a drastic change, and at a systems level, such a massive change could backfire because implementing such large, complex changes at once would be likely to fail. In addition, federalizing UI administration completely could make it harder to keep sensitive data secure and undermine the goal of increasing the focus on user-friendly access, given how disconnected the federal government is from ground-level user experiences.

The ideal setup would not depend upon Congress or an administration to change. Instead, it would encourage innovation at all levels within a unifying governance framework for linking data and protecting privacy. Cloud-based services, data trusts, and other options allow a balance between a nationally consistent data structure with distributed administrative functions, some flexibility to innovate at state and local levels, and cascading permissions assigned by role within the system for minimizing security risks.

"When we are looking at a national system that addresses federal, state, and local needs, what we're looking for is systems that can cascade into each other," one of the roundtable members said. "It does not mean a centralized, national system. What we're coming up with is a framework."

Although this vision can be generalized to many areas of policy and programming, there are also specific challenges in labor and education systems that may shape the priorities for digital transformation in the ecosystem. At the moment, addressing backlogs in UI benefits delivery and identity verification is still a pressing need in most states.[86]

Who benefits from better labor market information systems?

Job seekers 	Enhanced labor market information and career navigation platforms could address unequal access to information about jobs, careers, and how to get started in a new field, such as information about internships, apprenticeships, or professional networking opportunities. Unemployed and underemployed workers can also benefit from easier and more equitable access to benefits, programs, and services if the government prioritized user experience more.
Employers 	The current requirements for employers to report employment data to states are onerous and inconsistent. A shared data dictionary and options for employers to semi-automate their reporting from payroll would reduce reporting burdens while delivering higher-quality data, more frequent data, and more data fields. The interface can also be a touchpoint for offering business services and technical assistance to employers or reporting layoffs and hours reductions.
Local job center staff or career counselors 	A shared data dictionary across programs and a secure platform for linking systems and designating permissions would allow local staff to reduce duplicative data entry and develop coordinated intake across programs. More recent labor market information and the capacity to disaggregate data by occupation, industry, and geography would give local staff more information to identify what jobs are growing and how to target employers for placing candidates.
Program evaluators 	Enhanced labor market data stored in an integrated platform would allow programs to switch from individual evaluations over several years to a continuous approach that provides timely information to policymakers and program managers for targeting public investment. A unified platform that includes data for self-employed, freelance, and other workers excluded from wage records would improve the measurement of program performance outcomes.
Researchers 	Better labor market information would improve the ability of researchers to assess changes in the labor market by industry, occupation, and geography to inform policy decisions. Enhanced and more timely information would be especially valuable for understanding what is happening in labor markets during periods of crisis, such as the pandemic.
General public 	Better information about the labor market would empower workers and employers to make decisions based on more accurate and timely information about their local labor market; for example, information about whether or not there is a labor shortage at a given time.

Source: Authors.

POLICY RECOMMENDATIONS

The widespread failures of state systems to get UI benefits out to qualified individuals quickly during the pandemic has coalesced political support around the goal of making these systems better and finding a more cost-effective way of maintaining them in the long run. However, there is a danger that policymakers will focus on large, one-off investments in UI technology in each separate state and territory out of a sense of political urgency to spend big and get fast results. This section provides policy recommendations for how Congress and states could approach digital transformation efforts with a higher likelihood of success and cost-effectiveness. The recommendations are rooted in the following goals:

- Reducing the administrative burden on end users, including UI claimants, employers, program staff, training providers, and researchers/program evaluators.
- Enhancing the ability to use the data in the ecosystem for purposes beyond compliance reporting, such as real-time evaluation, more accurate and timely labor market information, and the ability to use data in the system to inform program decisions.
- Increasing the accessibility of services and benefits, especially for individuals with multiple barriers to employment and populations that have historically been excluded from the UI safety net.
- Enhancing security with updated infrastructure and capabilities to respond in a more agile fashion to rapidly evolving security threats.
- Making it easier to scale software solutions and data infrastructure across states and programs, rather than relying on 53 custom systems and duplicative data entry across programs, which is costly and inefficient.

Our policy recommendations are focused in four areas: national data standards, continuous improvement, coverage, and security.

> **There is a danger that policymakers will focus on large, one-off investments in UI technology in each separate state and territory out of a sense of political urgency to spend big and get fast results.**

1. National data standards and data-sharing: Federal policymakers should create an institutional "home" for national data governance, and require that entity to establish a national framework for collecting, sharing, accessing, reporting, and protecting program participant and employment data across states, federal agencies, and programs in a consistent and secure manner. Congress should authorize funding to develop and maintain a shared data dictionary across federal agencies such as the Department of Health and Human Services, the Department of Labor, the Department of Education, and the Department of Commerce. These resources should be allocated with a continuous and agile approach in mind. More resources will be needed to build staff capacity to protect privacy, improve security, and implement the shared data dictionary and data-sharing vision across federal agencies, states, and programs.

- Convene an interagency, multi-stakeholder task force to establish goals of a national data framework and create a standardized data dictionary for common data elements that are collected across multiple agencies and programs, building on the assets already created under the Foundations for Evidence-Based Policymaking Act of 2018. The task force can start by developing a schema of data sources, data needs, and use cases across programs and agencies.
- Include technologists, designers, and legal/procurement experts in the early stages of the design of a national data framework and standardized data dictionary to ensure that the framework is feasible and aligned with the technical and legal context for using it.
- Continuously build cross-state and cross-program infrastructure for standardizing data collection, streamlining intake forms, validating data, and more through cloud services ("software as a service").
- Consider the pros and cons of data storage options that are more or less centralized vis-à-vis balancing the goals articulated above to protect individuals' data and generate more value from data through secure sharing. For example, consider the benefits, costs, and risks of establishing a national data trust with tiered permissions and clearly defined use cases for individuals, local governments, and state governments. Consider options for housing the data trust, such as at a major public university research center. Ensure the infrastructure for sharing data across states integrates a way for users to access their own information about their cross-state earnings to make sure it is accurate.[87]
- Learn from analogous data standards and data-sharing frameworks in other areas of government, such as the National Emergency Medical Services Information System (NEMSIS).[88] NEMSIS is a collaborative national database housed at the University of Utah for storing patient care data from states and territories that enables local, state, and national utilization of the data.
- Create a process for continuously improving and updating the national data framework and ensuring that there is ongoing multi-stakeholder and cross-agency input, technical assistance to state and local governments, and balance between the potential value of better data utilization for authorized use cases and the evolving risks involved with greater data-sharing and linking.

These recommendations can apply beyond the labor and education ecosystem, but within it, we recommend starting with a transition away from relying on UI wage records as the primary source for employment and earnings data and instead create a new reporting and records system that is designed to capture a wider, more frequent, semi-automated, and more representative range of employment information. The JEDx case study offers a starting point for

modernizing employment data reporting and data systems—the initiative has employer support because it eases the reporting burden on employers yet still has potential to vastly improve the frequency, quality, usability, and security of this data for individuals and local, state, and federal programs. UI programs can pull relevant data from this source data as needed, but other programs and users can also access data that is more appropriate for their needs.

Congress should play a leadership role in mandating or incentivizing states to develop partnerships around implementing standard data dictionaries and more streamlined data-sharing and validation procedures. In addition, federal agencies can authorize grants for business process re-engineering to adapt various program processes to the updated data management and collection model under the national framework.

This vision for a national data framework should be utilized across congressional committees so that it is incorporated into efforts to reauthorize legislation throughout the ecosystem, such as WIOA, the Supplemental Nutrition Assistance Program, the Higher Education Act, the American Innovation and Competitiveness Act, Temporary Assistance for Needy Families, etc. Congress must ensure that the ecosystem infrastructure and implementation of the national data standards and data-sharing framework is adequately funded to support state-level implementation, research facilities, talent development (e.g., staff training, apprenticeships), competitive salaries, pilots and prototypes, learning communities, business process redesign initiatives, and technical assistance.

Even in the absence of federal action in establishing a standard data dictionary, states can take steps such as creating decision trees for data-sharing so that legal counsel does not have to be involved in every request. States can build on the examples in the case studies to consider other ways of making their labor and education data more customer-focused and more efficient to maintain and update. States can also draw on promising practices to link and share data for the purpose of streamlining intake across programs, and they should consult with local areas and end users in the process of piloting and improving common intake forms.

2. Continuous improvement: Build the capacity of states and the federal government to pursue continuous improvement of labor and education data systems over time, rather than making one-time large investments in technology that are disconnected from process redesign efforts and typically have limited input from user experience.

To address the cultural challenge of risk aversion, high failure rates of large outsource efforts, and high costs of updating 53 separate systems, federal, state, and local governments should shift how they approach the development of technology and data systems in labor and education programs. Shifting from waterfall style to agile development of systems will require more internal capacity at the state level in several areas of expertise, including more resources for:

- Technical assistance and training, including training for legal, contracts, and procurement staff so that they understand agile budgeting and funding streams for technology projects, building on tools such as the 18F software budgeting handbook.[89]
- Access to experts in digital services, such as the support available through the U.S. Digital Service and 18F.
- Hiring and developing more expertise in areas such as software engineers, business analysts, designers, cybersecurity analysts, data scientists, and cloud services (including competitive pay schedules for those positions).
- Cross-state learning activities and opportunities to share the costs of continuous improvement across more than one state.
- Continued support for technical assistance, such as the NASWA UI Integrity Center, including efforts to directly include state-level innovators in the task force for designing a national data framework.

Other recommendations for shifting to a continuous improvement model that balances the goals noted above include:

- Make a concerted effort to replace aging hardware with more modern technology and migrate some functions to cloud services, data trusts, and other digital services that are more capable of handling high volumes and have more sophisticated data privacy and security capabilities.
- Consider a gradual migration to a national data trust and shared data dictionary for employment and program participant data (see previous section), as well as a user-friendly interface for program staff, officials, and individuals to extract data securely at an appropriate level of confidentiality and aggregation depending on the use case and research question.
- Build on the achievements of the T3 Network, Coleridge Initiative, and other existing multi-stakeholder initiatives that have laid important groundwork.
- Ensure that the learning community, cloud-based platforms for collaboration, and resources for states are open source and accessible for researchers and the general public, with appropriate safeguards for protecting proprietary, private, or sensitive data.
- Convert existing state grants for state-level innovation such as the Workforce Data Quality Initiative to a formula funding stream for data system innovation, so that each state has resources to innovate, hire permanent staff, and pilot solutions to address problems in their ecosystem.
- Consider ways of making supplemental data available to more than one state and putting processes in place for assuring the quality of private data sets; and in the long run, create higher-quality public data sets for employment data such as hours worked, earnings, and benefits receipt.

States can reduce the risk of lock-in to custom vendors by procuring smaller elements at a time, establishing a standard data dictionary across programs, and using open source clauses in procurement.[90] Finally, states should be proactive about launching public education and awareness campaigns for their citizens to increase digital literacy, including how to protect their privacy and security online.

In the short run, states should focus on starting small and augmenting their legacy systems to improve them over time, guided by the following questions:

- Who are you building for?
- What are the short- and long-term goals?
- Why make investments to share and use data? What is the value proposition?
- How do the value propositions and research interests vary for different stakeholders?
- What metrics will you use to track improvement and assess equity in access and outcomes?
- What can you learn from other states or analogous digital transformation efforts in health care, transportation, etc.?

Federal policymakers should mandate that states do more to make useful data available securely to local program leaders and data analysts, including a process to regularly solicit research questions and data needs from local leaders to ensure that continuous improvement efforts incorporate their needs and the needs of end users such as job seekers and employers. Some states, such as Texas and Ohio, already have a user interface for local program staff to access disaggregated labor market information from UI wage records and, in some cases, pull data to send customized text messages to target groups of unemployment insurance claimants.[91] The Department of Labor should mandate that states develop data dashboards for local program staff and set guidelines on how to ensure that the data available through the interface is responsive to the data needs and questions of local staff.

3. Coverage: Develop a more comprehensive and representative data source for employment data that adequately captures information from individuals who have historically been excluded from UI wage records and for data elements that UI wage records do not capture (such as occupation of employment or employer-provided training) that would be useful for career services program management and policy research.

UI wage records were not designed to be used in all the ways that they are currently required to be used by different programs and education providers. At best, they are a weak proxy for capturing performance outcomes for the populations that the publicly funded workforce system aims to serve due to the high likelihood that program participants engage in alternative work arrangements such as self-employment, gig work, or freelance work either as primary income or supplemental income to earnings from a low-wage job. In order to include workers with these non-wage forms of income in our safety net and labor market information systems, we will need to develop more robust data collection and validation processes.

In the short term, state and local policymakers can consider piloting partnerships with app-based platforms that already capture many workers in non-waged work arrangements to gather some supplemental data for reporting and data analytics purposes. There are several pilots emerging to set up a system for gathering hours and earnings data for gig, self-employed, and other workers who are not captured in UI wage records, such as "The Workers Fund"[92] from the Workers Lab and Steady, and CalFLEXI, which pilots a platform that the U.K. government developed for hourly workers for use in the U.S.[93] State leaders and policymakers can learn from or take steps to support and expand a platform once it has demonstrated success.

One challenge these services struggle to address is that app-based and online services often leave behind lower-wage workers and workers who are less digitally connected. This represents a significant gap in coverage from an equity perspective in public policy. Private data sets also often suffer from similar quality control problems, ethical issues with data privacy protocols, or high costs to purchase the dataset. Long term, it is worth piloting a public or public-private effort to establish a data trust with more comprehensive source data that improves coverage and has consistent quality controls and security protocols in place. The federal government can also examine how self-employment programs gather and track employment data from participants in the states that have pilots to see if there is already infrastructure in place to build on.

Improving the coverage of employment data that is used to assess program impacts is important from an equity perspective. There is going to be a persistent disincentive for programs to enroll anyone who is unlikely to engage in waged work because it is difficult and time-consuming for the local program to get credit for placing them in employment or meeting earnings performance metrics if the participant's earnings are not in the UI wage records. Many of the job seekers with the most barriers to obtaining a waged job have more success in self-employment, entrepreneurship, or freelance work, such as people leaving incarceration.

4. Security: Update the national legal and regulatory framework to clarify data ownership rights, security standards, and privacy and data ethics assurance processes; and make a concerted effort to update existing data systems to handle confidentiality and access protocols for a wider range of use cases than a state-controlled administrative database allows.

Although state leaders who currently approve or deny data sharing agreements are often reluctant to share data out of valid concerns about security and privacy, the lack of a more broad-based update to the federal policy framework for data governance and outdated technologies that store existing data is a significant barrier in the long term to protecting the data of Americans in the labor and education. Although specific privacy laws and regulations are beyond the scope of this report to recommend, the following recommendations are particularly relevant to labor and education data systems according to the participants in our roundtables:

- Convene experts on privacy and security to develop a modern regulatory framework that balances the need for standards and protections with constant changes and customized needs by industry or area. Currently, the culture of data-sharing is dominated by fears of risk rather than a balanced sense of the value of sharing versus risk.
- Establish a federal "home" for digital transformation, privacy, and governance efforts, such as proposals to create a new agency to oversee digital rights and governance. The lack of clear authority to oversee data governance creates confusion and conflicting rules from one privacy law to the next. State technologists often struggle to comply with conflicting laws and regulations as they administer programs.
- Consider making sure that if deidentified data is made available through data trusts or other mechanisms, any algorithms that are developed based on the data are open source and accessible for regulatory agencies to assess for bias and discrimination.

CONCLUSION

The historic surge in demand for unemployment benefits during the COVID-19 pandemic laid bare many of the underlying problems that have been festering for decades in labor and education data systems. The growing chorus of outrage at how challenging it was for states to get relief to the right people quickly and the widespread instances of fraudulent claims are creating a window of opportunity to reassess data, technology, and processes in this ecosystem. In a fast-changing economy with large-scale disruptions like the pandemic and the rise of new technologies that pose new opportunities and privacy risks, it is time to start on a long-term journey of improvement.

The members of our roundtable articulated a vision for a labor market and education data ecosystem that is "a living resource" and can evolve as technology continues to change. Critically, this ecosystem should embed user experience more fundamentally into the process and, in doing so, better serve the workers who have the most barriers to employment and workers we have historically excluded from our safety net. It is time to put this vision of ongoing digital transformation into action to restore basic trust in government.

This ecosystem should embed user experience more fundamentally into the process and, in doing so, better serve the workers who have the most barriers to employment and workers we have historically excluded from our safety net.

APPENDIX

A sample of existing initiatives focusing on improving data quality, use, and alignment:[1]

The Coleridge Initiative

Started at New York University, the Coleridge Initiative is a nonprofit data democratization project that works to improve the use of data in governance and policymaking. Their collaborators include nonprofits, universities, private companies, and government agencies. The initiative provides their Applied Data Analytics programs to government agencies and their employees to teach data use in decisionmaking to policymakers at all levels of government.

RehabData Workgroup

Under the U.S. Department of Education, the RehabData Workgroup is a multi-stakeholder workgroup composed of the Rehabilitation Services Administration, Council of State Administrators of Vocational Rehabilitation, National Council of State Agencies for the Blind, and vocational rehabilitation (VR) administrative agencies. The workgroup began in 2019 to improve the use of data in VR programs to "tell the story" of program effectiveness and improve reporting and evaluation for programs that serve people with disabilities. The workgroup created the "ReThink VR Performance" initiative in 2019 to develop and distribute tools and information that state VR agencies may use to assess program performance using existing data collected by VR programs. This data is also used to report required Workforce Innovation and Opportunity Act (WIOA) performance measures and track program integration and co-enrollment between VR and other WIOA core programs.

NASWA Workforce Information Technology Support Center (WITSC)

The National Association of State Workforce Agencies (NASWA) provides technical assistance for state WIOA program partners through WITSC in the form of online resources for state workforce agencies, including a knowledge exchange library, a repository of state technology systems used to deliver WIOA services, and crowdsourced procurement language.

Results for America's Evidence in Workforce Lab

Results for America (RFA) is a nonprofit organization focused on providing policymakers the ability to make data-driven decisions. Their State and Local Workforce Fellowship brings together select state- and municipal-level workforce practitioners. Through this fellowship, RFA has created the Evidence in Workforce Lab as a research and outreach community that provides recommendations to governments on executing evidence-based workforce policy proposals.

Data for the American Dream

Through funding and support by Schmidt Futures and other philanthropic entities, the Data for the American Dream initiative supports efforts to expand access to workforce system data for public and private agencies, with the intent of improving job seeker and student tools for navigating and accessing opportunity.

The Midwest Collaborative

A region-specific collaboration through the Coleridge Initiative, the Midwest Collaborative brings together universities and education and workforce agencies to build integrated data systems that can respond to labor markets stretching across state jurisdictional borders.

The T3 Innovation Network

The T3 Innovation Network supports emerging technologies and collaborations in the workforce and talent development ecosystem. A network of over 500 organizations, it builds off existing U.S. Chamber of Commerce Foundation initiatives, including:

- **Jobs and Employment Data Exchange** (JEDx): A partnership between the U.S. Chamber of Commerce Foundation and the HR Open Standards Consortium to create and promote public-private standards for job descriptions and postings. JEDx aims to improve and streamline how employers report data to the government, produce better longitudinal jobs data, and better allow employees to verify work history and eligibility for government benefits.

- **The Learning and Employment Record Resource Hub**: The hub supports learning and employment records (LERs) pilots to improve and standardize integration between education and employment data through public-private partnerships. LERs aim to address labor market signaling failures that stem from overreliance on a traditional college degree as a proxy for skill in the hiring process, which excludes the majority of U.S. residents and citizens that do not have a four-year degree. LERs help employers more efficiently identify, select, and verify job candidates based on skill and education levels (not degrees alone), and they help workers and students signal skills and experience in the labor market beyond what a degree alone can signal (e.g., on-the-job learning, military experience, etc.).

The Workforce Data Quality Initiative (WDQI)

A partnership between the departments of Labor and Education, WDQI works to develop and/or enhance longitudinal databases that integrate education and workforce data. With a focus on supporting states in their efforts to build longitudinal data systems that can follow students from school to a career, WDQI offers grants and technical assistance to state governments working to build their capacity and data systems.

The Beeck Center's State Software Collaborative

The Beeck Center's State Software Collaborative at Georgetown University helps states collaborate on the creation of similar software systems across jurisdictions, such as those that run unemployment insurance or Medicaid. The collaborative aims to help develop and build software that can be tailored to individual states' needs and eliminate the need for 50 distinct procurement processes states all go through to build similar systems.

Credential Engine

Credential Engine is a nonprofit organization mapping the landscape of U.S. credential availability to provide businesses, governments, and job seekers the ability to access consistent information about career pathways and credential data. The organization provides web-based services to help stakeholders build credential registries, including tools to build common description languages, compare credentials within and between industries, and support customizable search features within repositories.

Integrated Benefits

Integrated Benefits is a digital transformation program run by Code for America, the Center on Budget and Policy Priorities, Nava, and Civilla. It aims to improve the accessibility of social benefit programs; for example, by consolidating states' food assistance and cash benefits applications into one form. The program is active in five states, partnering with state government and civic tech organizations to streamline how individuals access benefits and how states deliver services and assistance.

---

[1] *This is not an exhaustive list of initiatives. There are multiple national, state, and local initiatives focused on data integration and better use of data in labor and education system, and we strived to identify and include some of the largest examples. Furthermore, 18F and the United States Digital Service are federal government organizations that assist with data transformation projects on an ongoing basis, and it is worth noting their role even though they are not an initiative per se.*

Key data systems that are in use in labor and post-secondary education programs

Type of systems	Description	Users
Unemployment insurance wage records	Employers are required to report quarterly earnings, hours, demographic data, industry data, and occupational data for their employees to the state. This data is used to provide detailed labor market information, inform labor market research, assess performance of education and labor programs, and maintain records for taxation, UI benefits, and labor law purposes.	Employers as providers of data, and a wide range of end users access it at different levels of aggregation.
Labor exchanges	States maintain labor exchanges to match job candidates with openings and track participation in employment services programs. The systems include applicant resumes, cover letters, and demographic information; employer job postings and company information; and resources for job searching and training opportunities.	Individuals using American Job Center resource rooms, online services, or partner programs; employers posting jobs or job fair content; staff from state or local agencies.
Case management and participant tracking systems	States and local areas maintain digital (and sometimes paper) case management systems for conducting program intake and tracking participants in a wide range of programs, including demographic data, eligibility data, services received, training participation, case notes, and documentation. In most states, there are separate systems for different programs, and some are operated at the state level while others are locally procured and managed. They are not typically linked with other programs, and most often use different data dictionaries, intake forms, and data validation processes across programs.	Program staff and managers.
Unemployment benefits systems	States maintain systems for processing, adjudicating, and delivering unemployment insurance benefits claims.	Unemployed workers, employers, and state agency staff and managers use these systems.
State longitudinal data systems	The Department of Labor and Department of Education have issued grants to many states to develop longitudinal data systems that strive to integrate education and labor data systems to better understand labor market outcomes of education programs and how they vary for different types of learners.	State labor and education agency staff and managers; in some cases, third-party data partners such as university research centers.

RESOURCES

Ryan Burke, et al., 2021. "A playbook for improving unemployment insurance delivery.": **https://www.newamerica.org/new-practice-lab/playbook/improve-unemployment/**.

Cyd Harrell, 2020. *A civic technologist's practice guide.* San Francisco, CA: Five Seven Five Books.

Tara Dawson McGuinness and Hanna Schank, 2021. *Power to the public: the promise of public interest technology*. Princeton, NJ: Princeton University Press.

National Association of State Workforce Agencies and National Association of Workforce Boards, 2018. "A changing workforce development landscape: the current state of data technology systems and preparing for what lies ahead." **https://www.naswa.org/system/files/2021-03/wioareport6-18-18web.pdf**.

NESTA toolkit on data-sharing: **https://media.nesta.org.uk/documents/Data_sharing_toolkit.pdf.**

18F de-risking guide: **https://derisking-guide.18f.gov/.**

ENDNOTES

1. Richardson, Y., & Pahlka, J. (2020). Employment Development Department Strike Team detailed assessment and recommendations. California Government Operations Agency. https://www.govops.ca.gov/wp-content/uploads/sites/11/2020/09/Assessment.pdf.

2. Wandner, S. (2019). Four decades of declining federal leadership in the federal-state unemployment insurance program (Upjohn Institute Working Paper 19-314). W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/wp19-314.

3. A changing workforce development landscape: The current state of data technology systems and preparing for what lies ahead. (2018). National Association of State Workforce Agencies and National Association of Workforce Boards. https://www.naswa.org/system/files/2021-03/wioareport6-18-18web.pdf.

4. When employers lay off workers in the U.S., they are not required to report the layoff to the state unless they have 100 or more employees and are laying off 50 or more workers in a 30-day period under the Worker Adjustment and Retraining Notification Act (WARN) of 1988. In many cases, employers do not share information with government officials about which workers were impacted, which impedes or delays the state or local area from reaching the impacted workers. The lack of timely and complete data on layoffs slows the state's response in an economic crisis and makes it impossible to know how effective states are at reaching all of the displaced workers. It has been especially challenging to track job losses in the COVID-19 pandemic, because many industries that laid off workers were small businesses (such as restaurants or hotels). In many cases, those smaller layoffs cumulatively were equivalent in economic impact to a mass layoff because they occurred in a concentrated area over a short period of time. Normally, such a large number of layoffs would trigger substantial state rapid response activities, but this response was likely muted in the pandemic because of the composition of the key industries that laid off workers, such as hospitality. As a result, many workers in these industries were not notified of the services available to help them adjust to their job loss.

5. National Association of State Workforce Agencies, Center for Employment Security Education and Research, & Information Technology Support Center. (2010). National view of UI IT systems (p. 22). 2021-03-26. http://www.itsc.org/itsc%20public%20library/NationalViewUI_IT%20Systems.pdf.

6. The Workforce Innovation and Opportunity Act (WIOA) requires that education training providers supply labor market outcome data on all their students to qualify for WIOA funds, and UI wage records are the primary data source for assessing these outcomes. Because public two-year colleges are the most common providers of WIOA-funded training, education data systems are an important partner for data-sharing conversations about labor market information and employment.

7. We recruited participants for the roundtables from the Brookings Metro Workforce Innovators Network (an informal network of local workforce development board leaders), the Workforce Data Quality Initiative (state-level grantees who receive funding from the U.S. Department of Labor and U.S. Department of Education to link education and employment data systems), civic technology leaders familiar with unemployment insurance, and a selection of representatives from other organizations and consultants who were actively working on digital transformation in labor and education systems. The group is not necessarily representative of all the efforts happening in labor and education systems, but it was selected to balance diverse perspectives across geographic areas of the U.S., subject matter expertise, and level of operation (local, state, national, etc.).

8. COBOL is an older programming language that is hard to find in the labor market today. As reported in New York Magazine: "We have systems that are 40-plus years old," said Governor Phil Murphy from New Jersey. "There'll be lots of postmortems, and one of them will be how the heck did we get here, when we literally needed COBOL programmers?" Feldman, Brian. April 6, 2020. "NJ governor requests expertise of 6 people who still know COBOL." Source: https://nymag.com/intelligencer/2020/04/what-is-cobol-what-does-it-have-to-do-with-the-coronavirus.html.

9. Cohen, P. (2020, October 1). Fraud schemes exploit weak spots in unemployment claims system. The New York Times. https://www.nytimes.com/2020/10/01/business/economy/unemployment-benefits-fraud.html.

10. Swanson, I. (2021, February 22). States paying billions in fraudulent unemployment claims. The Hill. https://thehill.com/homenews/state-watch/539881-states-paying-billions-in-fraudulent-unemployment-claims.

11. Note: UI wage records are one source of data for the Bureau of Labor Statistics Quarterly Census of Employment and Wages, but other data sources are also incorporated into that dataset.

12. Czajka, J. L., Patnaik, A., & Negoita, M. (2018). Data on earnings: A review of resources for research. Mathematica Policy Research. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/Data-on-Earnings-Report.pdf.

13. Source: https://www.congress.gov/bill/116th-congress/house-bill/748.

14. Wandner, S. (2019). Four decades of declining federal leadership in the federal-state unemployment insurance program (Upjohn Institute Working Paper 19-314). W.E. Upjohn Institute for Employment Research. https://doi.org/10.17848/wp19-314.

15. Simon-Mishel, J., Emsellem, M., Evermore, M., LeClere, E., Stettner, A., & Coven, M. (2020). Centering workers-how to modernize unemployment insurance technology. The Century Foundation, National Employment Law Project, Philadelphia Legal Assistance. http://stage.nelp.org/wp-content/uploads/UI-mod-report_FINAL.pdf.

16. The U.S. Digital Service has a resource page with more information about data dictionaries: https://www.usgs.gov/products/data-and-tools/data-management/data-dictionaries.

17. Vision for the one-stop delivery system under the Workforce Innovation and Opportunity Act (WIOA) (Technical Assistance Circular RSA-TAC-15-01). (2015). U.S. Department of Education Office of Special Education and Rehabilitation Services, Rehabilitation Services Administration. https://www2.ed.gov/policy/speced/guid/rsa/subregulatory/tac-15-01.pdf.

18. JEDx: Jobs and Employment Data Exchange: Modernizing America's workforce data through a public-private approach. (2021). U.S. Chamber of Commerce Foundation. https://www.uschamberfoundation.org/sites/default/files/JEDx%20Report_June2021.pdf.

19. Goger, A., Hadden Loh, T., & George, Caroline. (2020). Unemployment insurance is failing workers during COVID-19. Here's how to strengthen it (Brookings Metro COVID-19 Analysis). Brookings. https://www.brookings.edu/research/unemployment-insurance-is-failing-workers-during-covid-19-heres-how-to-strengthen-it/.

20. Fields-White, M., Graubard, V., Rodríguez Álvarez, A., Zeichner, N., and Robertson, C. (2020). Unpacking inequities in unemployment insurance. Washington, DC: New America. https://www.newamerica.org/pit/reports/unpacking-inequities-unemployment-insurance/introduction/.

21. Gitis, B. (2020, July 30). Survey points to potential racial disparities in approval rates for unemployment insurance claims. Bipartisan Policy Center. https://bipartisanpolicy.org/blog/survey-points-to-potential-racial-disparities-in-approval-rates-for-unemployment-insurance-claims/.

22. U.S. Department of Labor. (2020). Comparison of state unemployment insurance laws. https://oui.doleta.gov/unemploy/pdf/uilawcompar/2020/complete.pdf.

23. Carnahan, R., Hart, R., & Jaquith, W. (2019). State software budgeting handbook. https://github.com/18F/technology-budgeting.

24. Liberman, E. (2017, September 16). "All you need to know about the UHIP disaster." Rhode Island Monthly. https://www.rimonthly.com/unified-health-infrastructure-project/.

25. Simon-Mishel, J., Emsellem, M., Evermore, M., LeClere, E., Stettner, A., & Coven, M. (2020). Centering Workers-how to modernize unemployment insurance technology. The Century Foundation, National Employment Law Project, Philadelphia Legal Assistance. http://stage.nelp.org/wp-content/uploads/UI-mod-report_FINAL.pdf.

26. Wamsley, L. (2020, August 6). Gov. says Florida's unemployment system was designed to create "pointless roadblocks." NPR. https://www.npr.org/sections/coronavirus-live-updates/2020/08/06/899893368/gov-says-floridas-unemployment-system-was-designed-to-create-pointless-roadblock.

27. Carnahan, R., Hart, R., & Jaquith, W. (2019). State Software Budgeting Handbook. https://github.com/18F/technology-budgeting.

28. Ibid.

29. The OMB Clearance requirements were established as part of the Paperwork Reduction Act of 1995. More details are available on the OMB website: https://www.usability.gov/how-to-and-tools/guidance/pra-overview.html.

30. George, M. L. (2003). Lean six sigma for service: How to use lean speed and six sigma quality to improve services and transactions. New York : McGraw-Hill.

31. Harrell, C. (2020). A civic technologist's practice guide. Five Seven Five Books.

32. Mulligan, S. P., Freeman, W. C., & Linebaugh, C. D. (2019). Data protection law: An overview (No. R45631). Congressional Research Service. https://fas.org/sgp/crs/misc/R45631.pdf.

33. Bannan, C., & Gambhir, R. (2021). Does data privacy need its own agency? Comparing FTC and DPA enforcement of a future federal privacy law. New America. https://www.newamerica.org/oti/reports/does-data-privacy-need-its-own-agency/introduction/.

34. Source: UI Information Technology Support Center: http://www.itsc.org/Pages/UIITMod.aspx. Note: Although a state is categorized as having completed modernization of UI benefits systems, that does not necessarily mean that the state has processed claims effectively during COVID-19. For example, Florida was the slowest state to process UI claims last year, even though it is classified as having completed modernization. Source: Wamsley, L. (2020, August 6). Gov. says Florida's unemployment system was designed to create "pointless roadblocks." NPR. https://www.npr.org/sections/coronavirus-live-updates/2020/08/06/899893368/gov-says-floridas-unemployment-system-was-designed-to-create-pointless-roadblock.

35. McGuinness, T. D., & Schank, H. (2021). Power to the public: The promise of public interest technology. Princeton University Press.

36. Harrell, C. (2020). A civic technologist's practice guide. Five Seven Five Books.

37. National Association of State Workforce Agencies, Center for Employment Security Education and Research, & Information Technology Support Center. (2010). National view of UI IT systems (p. 22). 2021-03-26. http://www.itsc.org/itsc%20public%20library/NationalViewUI_IT%20Systems.pdf.

38. Note: this is especially relevant for populations that have historically been excluded from quality jobs in the labor market, such as people with disabilities, Black workers, Latino or Hispanic workers, new entrants, people with conviction records, and older workers, among other groups. Frontline staff may be reluctant to enroll them out of fear that individuals with barriers may not successfully obtain a job, which is necessary for the local area to achieve WIOA performance goals.

39. Carnahan, R., Hart, R., & Jaquith, W. (2019). State software budgeting handbook. https://github.com/18F/technology-budgeting.

40. Czajka, J. L., Patnaik, A., & Negoita, M. (2018). Data on earnings: A review of resources for research. Mathematica Policy Research. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/Data-on-Earnings-Report.pdf.

41. Howell, D. R., & Kalleberg, A. L. (2019). Declining job quality in the United States: explanations and evidence. RSF: The Russell Sage Foundation Journal of the Social Sciences, 5(4), 1–53. https://doi.org/10.7758/RSF.2019.5.4.01.

42. Note: States are allowed to use supplemental data sources to get credit for workers who are excluded from the UI wage records, but it is cumbersome and more intrusive for the customer, who is typically asked months after leaving services to provide a lot of income documentation to allow the program to get credit. Many states and local areas purchase expensive private data to supplement UI wage records to compensate for the lack of publicly available data sources to meet this need, and many of those datasets are not as complete or as rigorous as a public dataset.

43. Studies of employer-provided training currently have to rely on private data sources. See Goger, Negoita, DeFever, and Nowaczyk. 2020. "State of California Employment Training Panel program assessment." Oakland, CA: Social Policy Research Associates. https://etp.ca.gov/wp-content/uploads/sites/70/2020/07/SPR_ETP_ProgramAssessment-March2020.pdf.

44. McGuinness, T. D., & Schank, H. (2021). Power to the public: The promise of public interest technology. Princeton University Press.

45. Harrell, C. (2020). A civic technologist's practice guide. Five Seven Five Books.

46. Lane, J. (2020). Democratizing our data: A manifesto. Cambridge, Massachusetts : The MIT Press.

47. Yu, H., & Robinson, D. G. (2012). The new ambiguity of "open government." UCLA Law Review Discourse, 59(178). https://www.uclalawreview.org/pdf/discourse/59-11.pdf.

48. McGuinness, T. D., & Schank, H. (2021). Power to the public: The promise of public interest technology. Princeton University Press.

49. Harrell, C. (2020). A civic technologist's practice guide. Five Seven Five Books.

50. Central Digital and Data Office. (2020, July 2). Government functional standard GovS 005: Digital, data and technology. Gov.Uk. https://www.gov.uk/guidance/digital-data-and-technology-functional-standard-version-1.

51. Central Digital and Data Office. (2012, April 3). Government design principles. Gov.Uk. https://www.gov.uk/guidance/government-design-principles#tenth.

52. e-Estonia. (n.d.). E-identity. E-Estonia. Retrieved May 25, 2021, from https://e-estonia.com/solutions/e-identity/id-card/.

53. e-Estonia. (n.d.). We have built a digital society and we can show you how. E-Estonia. Retrieved May 25, 2021, from https://e-estonia.com/.

54. Silaškova, J., & Takahashi, M. (2020, July 1). Estonia built one of the world's most advanced digital societies. During COVID-19, that became a lifeline. World Economic Forum. https://www.weforum.org/agenda/2020/07/estonia-advanced-digital-society-here-s-how-that-helped-it-during-covid-19/.

55. Enterprise Estonia. (2020, March). Estonia organized a public-private e-hackatlon to hack the crisis. E-Estonia.Com. https://estonia.ee/estonia-organized-a-public-private-e-hackatlon-to-hack-the-crisis/.

56. Cho, Y. (2020, February 7). How is Korea preparing for the jobs of the future and what can we learn from them? World Bank. East Asia & Pacific on the Rise. https://blogs.worldbank.org/eastasiapacific/how-korea-preparing-jobs-future-and-what-can-we-learn-them.

57. Quaintance, Z. (2021, March 17). Biden White House makes government IT great again. GovTech. https://www.govtech.com/civic/Biden-White-House-Makes-Government-IT-Great-Again.html.

58. The draft text for the UI modernization bill is available here: https://www.bennet.senate.gov/public/_cache/files/e/7/e76d31fb-44f8-403c-aa05-beeba5e3c3af/A52E96B72709EEEFF911F266B9FFA56F.ui-reform-discussion-draft-goe21427-.pdf. The draft text for the State and Local Digital Service Act is available here: https://www.wyden.senate.gov/news/press-releases/-wyden-murray-introduce-legislation-to-modernize-state-and-local-tech-systems-.

59. Bhobe, R., Thong, M., & Wang, K. (2021, March 1). To reimagine unemployment insurance services, start small. Nava PBC Blog. https://blog.navapbc.com/to-reimagine-unemployment-insurance-services-start-small-8c93eb4f1eea.

60. JEDx: Jobs and Employment Data Exchange: Modernizing America's workforce data through a public-private approach. (2021). U.S. Chamber of Commerce Foundation. https://www.uschamberfoundation.org/sites/default/files/JEDx%20Report_June2021.pdf.

61. Czajka, J. L., Patnaik, A., & Negoita, M. (2018). Data on earnings: A review of resources for research. Mathematica Policy Research. https://www.dol.gov/sites/dolgov/files/OASP/legacy/files/Data-on-Earnings-Report.pdf.

62. JEDx one pager. (2020). U.S. Chamber of Commerce Foundation. https://www.uschamberfoundation.org/sites/default/files/JEDx%20One-Pager_May2021.pdf.

63. U.S. Chamber of Commerce Foundation, T3 Innovation Network, & HR Open Standard Consortium. (2021). Developing and using public-private data standards for employment and earnings records. https://www.uschamberfoundation.org/t3-innovation/background-reports.

64. The Midwest Collaborative includes Iowa, Illinois, Indiana, Kentucky, Michigan, Missouri, New Jersey, Ohio, and Tennessee.

65. Coleridge Initiative. (n.d.). Coleridge Initiative. Retrieved May 24, 2021, from https://coleridgeinitiative.org/.

66. National Association of State Workforce Agencies. (n.d.). Coleridge highlights. Retrieved May 24, 2021, from https://vimeo.com/user124259899/review/463781491/cd5c18cbc1.

67. ADRF – Coleridge Initiative. (n.d.). Retrieved April 20, 2021, from https://coleridgeinitiative.org/adrf/.

68. National Association of State Workforce Agencies. (n.d.). Coleridge highlights. Retrieved May 24, 2021, from https://vimeo.com/user124259899/review/463781491/cd5c18cbc1.

69. Fichera, D. (n.d.). Integrating eligibility and enrollment for Health and Human Services. Nava. Retrieved May 25, 2021, from https://www.navapbc.com/case-studies/integrating-eligibility-and-enrollment-for-health-and-human-services.html.

70. Code for America. (n.d.). Making it easier for people and families to access all their benefits in one place. Code for America. Retrieved May 25, 2021, from https://www.codeforamerica.org/programs/social-safety-net/integrated-benefits/.

71. Madison, C., Brown, S., Combs, M., Boskailo, T., & Gaudet, G. (2020). Integrated eligibility & enrollment. Legislatue.Vermont.Gov. https://legislature.vermont.gov/Documents/2020/WorkGroups/House%20Corrections%20and%20Institutions/DVHA/W~Cassandra%20Madison~Integrated%20Eligibility%20and%20Enrollment~1-17-2019.pdf.

72. Integrated eligibility & enrollment program. (2020, August 24). Github. https://github.com/VermontAHS/IEE-Program#in-scope-benefit-programs.

73. Angell, M., Gold, S., Howison, M., Kidd, V., Molitor, D., Burns, C., Johnson, C., Kahn, M., Venzke, S., Deneault, S., Doweiko, D., Dziembowski, S., Kumar, B., O'donnell, P., Patel, C., Reidl, A., Tardiff, B., Hastings, J. S., Jensen, S., … Sarathy, R. (2020). Delivering Unemployment assistance in times of crisis: Scalable cloud solutions can keep essential government programs running and supporting those in need. Digital Government: Research and Practice, 2(1), 5:1-5:11. https://doi.org/10.1145/3428125.

74. RIPL is a nonprofit research organization dedicated to using data science to improve public policy.

75. Modernized systems are those which support object-oriented programming, web-based services, and the use of relational databases. See also: Angell, et al, 2020. Note: States that still have legacy systems in-house may have more capacity for agile development and continuous improvement than states that have fully outsourced their systems to third-party vendors. Therefore, it is important to note that legacy systems are not always worse than modern systems in terms of state capacity to pivot from waterfall to agile development methods, and states with legacy systems are not constrained by vendor lock-in.

76. Goger, A., Hadden Loh, T., & George, Caroline. (2020). Unemployment insurance is failing workers during COVID-19. Here's how to strengthen it (Brookings Metro COVID-19 Analysis). Brookings. https://www.brookings.edu/research/unemployment-insurance-is-failing-workers-during-covid-19-heres-how-to-strengthen-it/.

77. Amazon. (2020, April 24). The cloud helps Rhode Island manage an unprecedented surge in UI claims. Governing. https://www.governing.com/work/Cloud-Helps-Rhode-Island-Manage-an-Unprecedented-Surge-in-UI-Claims.html.

78. Angell, M., Gold, S., Howison, M., Kidd, V., Molitor, D., Burns, C., Johnson, C., Kahn, M., Venzke, S., Deneault, S., Doweiko, D., Dziembowski, S., Kumar, B., O'donnell, P., Patel, C., Reidl, A., Tardiff, B., Hastings, J. S., Jensen, S., … Sarathy, R. (2020). Delivering Unemployment assistance in times of crisis: Scalable cloud solutions can keep essential government programs running and supporting those in need. Digital Government: Research and Practice, 2(1), 5:1-5:11. https://doi.org/10.1145/3428125.

79. The legislation is available here: https://www.congress.gov/bill/115th-congress/house-bill/4174.

80. Wandner, S. A. (Ed.). (2018). Unemployment insurance reform: Fixing a broken system. W.E. Upjohn Institute for Employment Research. https://www.jstor.org/stable/j.ctvh4zfsf.

81. Wandner, S. A., & King, C. T. (2021). Building a national unemployment insurance program (Better Employment and Training Task Force Policy Brief). National Academy of Social Insurance. https://skilledwork.org/wp-content/uploads/2021/03/Natl-UI-Brief_Revd_WandnerKing_022421_FINAL.pdf.

82. Dube, A. (2021). A plan to reform the unemployment insurance system in the United States (Policy Proposal 2021-03). https://www.hamiltonproject.org/assets/files/Unemplyment_InsurancePP_v4.2.pdf.

83. Bivens, J., Boteach, M., Deutsch, R., Diez, F., Dixon, R., Galle, B., Gould-Werth, A., Marquez, N., Roberts, L., Shierholz, H., & Spriggs, W. (2021). Reforming unemployment insurance: Stabilizing a system in crisis and laying the foundation for equity. A joint report of the Center for American Progress, Center for Popular Democracy, Economic Policy Institute, Groundwork Collaborative, National Employment Law Project, National Women's Law Center, and Washington Center for Equitable Growth. https://files.epi.org/uploads/Reforming-Unemployment-Insurance.pdf.

84. Wandner, S. A., & King, C. T. (2021). Building a national unemployment insurance program (Better Employment and Training Task Force Policy Brief). National Academy of Social Insurance. https://skilledwork.org/wp-content/uploads/2021/03/Natl-UI-Brief_Revd_WandnerKing_022421_FINAL.pdf.

85. Dube, A. (2021). A plan to reform the unemployment insurance system in the United States (Policy Proposal 2021-03). https://www.hamiltonproject.org/assets/files/Unemplyment_InsurancePP_v4.2.pdf.

86. Burke, R., Dickerson, M., Lockwood, L., McGuinness, T., Nitze, M., Roy, A., & Wright-Moore, E. (2021). A playbook for improving unemployment insurance delivery. New America. https://www.newamerica.org/new-practice-lab/playbook/improve-unemployment/.

87. Ibid.

88. The NEMSIS website has more information about NEMSIS: https://nemsis.org/what-is-nemsis/how-nemsis-works/.

89. Carnahan, R., Hart, R., & Jaquith, W. (2019). State software budgeting handbook. https://github.com/18F/technology-budgeting.

90. Jaquith, W. (2020, December 11). Government should procure custom software as open source. https://waldo.jaquith.org/blog/2020/12/government-open-source/.

91. The Ohio dashboard is available here: https://ui-claims.chrr.ohio-state.edu/.

92. The Workers Fund website is here: https://www.theworkerslab.com/the-workers-fund.

93. More information about CalFLEXI is available here: https://www.calflexi.com/about.

ACKNOWLEDGEMENTS AND ROUNDTABLE PARTICIPANTS

The authors are grateful for excellent research assistance from Aaliyah Dick and Eric Flores. We appreciate the enthusiastic partnership of local, state, and national experts who participated in the policy roundtables and their efforts to co-create this report with us. In addition, we acknowledge helpful comments and input from Alan Berube, Dave Guarino, Sha Hwang, and Zoe Blumenfeld, and an anonymous reviewer.

Brookings Metropolitan Policy Program convened three virtual roundtables on digital transformation in labor and education systems in the spring and early summer of 2021. The participants in the roundtables were:

Tamara Atkinson
Chief Executive Officer
Workforce Solutions- Capital Area (Texas)

Diana Barrett
Assistant Director of Research and Analysis
Indiana Department of Workforce Development

Tracey Carey
Executive Director
Midwest Urban Strategies

Angela Carr Klitzsch
President & CEO
EmployIndy

Alex Engler
David M. Rubenstein Fellow in Governance Studies
The Brookings Institution

Justine S. Hastings
Board Director
Research Improving People's Lives

Josh Hawley
Director
Ohio Education Research Center

Dr. Angela Jackson
Managing Partner
New Profit

Aimee Jahnke
Business Analyst: IS Business Automation Specialist
Wisconsin Department of Workforce Development

Waldo Jaquith
Fellow
State Software Collaborative at Georgetown University

Scott Jensen
CEO
Research Improving People's Lives

Adam Leonard
Director of Operational Insight
Texas Workforce Commission

Alyssa Levitz
Enterprise Program Advisor
U.S. Department of Labor

Andrew McGough
Executive Director
Worksystems

Sean Simone
Director, Research and Evaluation
Heldrich Center for Workforce Development at Rutgers

Kris Stadelman
Executive Director
NOVAworks – Silicon Valley

Jason A. Tyszko
Vice President of the Center for Education and Workforce
U.S. Chamber of Commerce Foundation

Michael Vente
Senior Director of Research and Data Governance
Colorado Department of Higher Education

Kristin Wolff
Senior Associate
Social Policy Research Associates

MORE INFORMATION

About the Brookings Institution:

The Brookings Institution is a nonprofit organization devoted to independent research and policy solutions. Its mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations for policymakers and the public. The conclusions and recommendations of any Brookings publication are solely those of its author(s), and do not reflect the views of the Institution, its management, or its other scholars. Brookings is committed to quality, independence, and impact in all of its work. Activities supported by its donors reflect this commitment.

About the Brookings Metropolitan Policy Program:

The Brookings Metropolitan Policy Program delivers research and solutions to help metropolitan leaders build an advanced economy that works for all. To learn more, visit **brookings.edu/metro**.

For more information

Annelies Goger
David M. Rubenstein Fellow
Brookings Metropolitan Policy Program
agoger@brookings.edu


Metropolitan Policy Program
at BROOKINGS