Credential Engine Learning and Employment Records Action Guide

Last Updated January 17th, 2024

Introduction

Diverse stakeholders, including policy makers, state and federal agencies, employers, community-based organizations, and education providers, are searching for ways to help learners and workers find the most efficient and equitable pathways to secure the right skills and credentials that lead to good jobs and careers. Credential and skill transparency helps stakeholders address a major source of labor market friction: unequal access to information about quality education and career opportunities for learners and workers, as well as information gaps in employer processes that often produce poor matches between available positions and candidates. With improved access to credential, skill, and job information, individuals have increased agency to find, understand, and compare opportunities to advance along their learning and career pathways, and employers can make more precise selections based on skills and competencies rather than degrees alone. Learning and Employment Records (LERs) are emerging as a powerful tool for accessing, linking, and verifying credential and skill information. Investments in LER technologies are aligned with broader state, regional, national, and global investments in information systems, data transparency, digital literacy, and learner/worker sovereignty. LERs enable individuals to represent all types of credentials, skills, and experience, which can improve labor markets and access to opportunities for all stakeholders.

There are over [1 million unique credentials](#) offered in the U.S. With so many credentials to choose from, people get lost and lose out on opportunity. Learners and workers too often don't know which credentials and skills lead to their desired learning and career outcomes. With limited information on skills, employers are unable to understand what skills workers actually bring to a job and tend to

over-rely on degrees to select candidates. Educators are increasingly under pressure to ensure that their programs help students succeed in the workplace, which can be challenging when they don't have reliable access to information from employers about the skills needed. This complexity is compounded by the fact that credentials are issued to individuals without transparent information about what skills those credentials represent. Data transparency that addresses these issues is an essential foundation for interoperable, meaningful, human- and machine-actionable LERs.

State leaders are in a unique position to require that LERs include transparent, interoperable information about credentials, skills, and experience and make these digital records foundational in their education and workforce strategies. Not only do states have responsibility for education and workforce training, but they have also invested in data systems for decision making in education and labor market improvements. State leaders can build a culture that encourages state government, employers, and education and training providers to work in a coordinated and aligned fashion to improve data transparency in learning and career systems, including LERs issued to individuals.

New LER technologies enable credential, employment, and skill data to be aggregated, analyzed, and made actionable for career success. LERs empower people with control over records of their own achievements, offering transformative opportunities to connect learning with careers and to improve the outcomes of investments in education and workforce development.

The big picture goal is to ensure that policy and actions create ecosystems where LERs are widely accessible, understood, and trusted, inclusive of all aspects of an individual's education, training, military, experiential learning, and work achievements, and securely shareable to connect people with opportunities. This Action Guide provides steps to get there, to enable more efficient career navigation and provide more equitable access to actionable information through LERs.

This Action Guide describes the phases and steps that stakeholders can follow to develop and sustain trusted LER ecosystems. These steps need to be iterative and cyclical, as stakeholders make progress, learn, and improve LER capabilities on an ongoing basis; a waterfall one-and-done approach will not meet the evolving needs in this arena. Portions of this Guide are based on Credential Engine's widely and successfully used [State Roadmap and Action Guide for Transparency](#) (see the History and Context section below). Specific LER supporting resources are included in this Guide, and there are related resources on the [Credential Engine state partnerships site](#). While many of these resources target state-specific actions, this Guide is intended to be broadly applicable for LER ecosystems. We encourage you to adapt these materials to connect the **why** and **how to** for LERs that meet the needs of your stakeholders.

We thank the many experts who have contributed to this Guide and provided resources that are rapidly evolving to support LER ecosystems. Together we can achieve the goal of empowering people with LERs that unlock equitable opportunities.

Phases and Steps (iterative and cyclical)

Understand *the Value*
- Learn how LERs can benefit learners, workers, educators, employers, policymakers, and other stakeholders
- Participate in cohorts for shared learnings and collaborative actions

Engage *with Key Stakeholders and Make the Case*
- Identify key stakeholders to engage
- Communicate clear goals, use cases, and stories illuminating the benefits for learners, workers, educators, employers, policymakers, and other stakeholders
- Identify what data about education, training, experiential learning, credentials, skills, and employment need to be transparent and publicly available to support use cases
- Understand and commit to interoperability principles
- Understand and commit to inclusive and equitable design

Analyze *Existing Policies, Initiatives, Data, and Technologies*
- Align with goals and initiatives for access, attainment, quality, affordability, economic advancement, and equity to ensure continuity and impact
- Inventory related credential, skill, and job data
- Inventory current related processes, staff capacity, vendors, and technologies
- Identify necessary wrap-around supports and providers
- Define an action plan to get from the current state to support for beneficial use cases

Implement *New or Improved Policies, Initiatives, Data, and Technologies*
- Execute on the action plan
- Publish and make transparent and actionable all related credential, skill, and employment data
- Implement or improve related processes and technologies
- Establish effective and equitable wrap-around supports

Sustain *through Enduring Commitment*
- Ensure sustainability through legislative, agency, and institutional policies that continuously improve LER processes, data, and technologies
- Establish processes for ongoing improvements
- Commit to durable infrastructure for enduring LER value

Understand

Understand *the Value*
- Learn how LERs can benefit learners, workers, educators, employers, policymakers, and other stakeholders
- Participate in cohorts for shared learnings and collaborative actions

The first step to making any change is recognizing current challenges and understanding solutions. A growing number of states are committing to using open standard LERs and making credential, skill, and job data open and public to provide meaningful context for LERs. Stakeholders exploring this work can build their knowledge and encourage their staff to learn about how to address equity and attainment goals, better align P-20W systems, improve learning outcomes, navigate economic changes, increase labor market participation, and align with other state priorities to improve learn and work ecosystems. Leaders should make the case about the value of this work for meeting the specific goals of the state. Cross-state and regional/national/federal/global collaborations can promote shared learnings and reinforce the value and interoperability of LERs across jurisdictions.

Leadership is critical to creating a vision for learning and career ecosystems that work (see the Stakeholders and Roles section below). Leaders need to raise expectations that everyone–opportunity seekers, employers, education and training providers, project leaders, and policymakers–deserves to have timely, accurate, accessible information to guide their decisions. Learning and career ecosystems can grow and thrive for everyone's benefit when actionable, transparent information is included in LERs, so that individuals can collect, curate, and share meaningful records of what they know and can do.

Resources for understanding
- Introductory resources, communities of practice, and civic and public interest technology background reading; these also provide additional resources:
  - [Centering Credential Transparency: A Case-Making Guide](#) (JFF)
  - [Credential Engine state partnerships](#) (Credential Engine)
    - [Learning and Employment Records: State Strategies](#) (introductory deck)
    - [State Roadmap and Action Guide for Transparency](#) (which serves as a basis for this Guide)
  - [Democratizing our Data](#) (Coleridge Initiative)
  - [Digital transformation in labor and education systems](#) (Brookings Institution)
  - [Education 2030 Sustainable Development Goal](#) (UNESCO)
  - [Multi-State Data Collaboratives](#) (National Association of State Workforce Agencies)
  - [Open Data for Meaningful, Valuable Learning and Employment Records](#) (2-pager) (Credential Engine)
  - [Skills-Driven State Community of Practice](#) (National Governors Association)
  - [SkillsFWD](#) (Rockefeller Philanthropy Advisors)

- o [T3 Innovation Network LER Resource Hub](#) (U.S. Chamber of Commerce Foundation)
  - ■ [Introduction to LERs](#) (video)
- o [Toolkit LER resources](#) (Credential Engine)
- o [Verifiable Credentials in Education](#) (Velocity Network Foundation)

Engage

Engage *with Key Stakeholders and Make the Case*
- Identify key stakeholders to engage
- Communicate clear goals, use cases, and stories illuminating the benefits for learners, workers, educators, employers, policymakers, and other stakeholders
- Identify what data about education, training, experiential learning, credentials, skills, and employment need to be transparent and publicly available to support use cases
- Understand and commit to interoperability principles
- Understand and commit to inclusive and equitable design

The next step to making any change is building awareness, understanding, and demand for that change with key stakeholders. By committing to and communicating multiple aspects of the value and importance of LERs, stakeholders will be positioned to understand next steps and see their roles in the work. Key stakeholders need to be identified to engage in the initial definition of the goals, use cases, and stories that will then be used to engage additional stakeholders (see the Stakeholders and Roles section below).

One key dimension is understanding how current, comprehensive, and comparable data in open standard LERs will help advance states' priority goals and initiatives. Everyone should have access to real-time, complete, and trustworthy public, non-personally identifiable information that lets them make the best informed decisions about how to match achievements with opportunities.

Unless credentials and skills are defined using consistent language and data structure, comparisons and connections among them are inefficient and unreliable, which limits their value for decision making. The Credential Transparency Description Language (CTDL) is an open-source schema that makes it possible for all credentials, skills, jobs, pathways, and more from a full range of providers and sources to be more reliably defined, organized, and compared. Without a commitment to have information in open data structures, stakeholders lack transparency about what LERs mean and how they are valuable.

Stakeholders who manage data will find their roles in different areas of the work needed to support LER ecosystems, including: harmonizing and combining data across systems; establishing secure processes and protocols for linking and sharing data; analyzing wage, job, and occupation data to better measure education/training impact; evaluating high-demand skills/jobs; building effective skill-job connections; providing equitable supportive services; aligning employers' data with job seekers' data; and adapting state credential data to LER processes.

Open standards interoperability is foundational and needs to be considered from the beginning of LER initiatives. Global open standards enable verification, portability, and meaningful exchange across learn and work contexts, unlocking the value of learning anywhere. Principles of interoperability include not only data and technology standards, but also commitments to transparent access to information, inclusive design, and privacy, security, legal, and regulatory adherence. Interoperability includes the ability for systems *and* processes to work together, aligned across education and workforce, public and private. Technical interoperability is not sufficient without informed commitment to underlying principles that make LERs meaningful, valuable, and equitable in human-centered processes. Understanding and committing to these underlying principles need to precede technology decisions so that LERs benefit the broadest set of individuals possible.

Resources for engaging
(*See also resources above; many of these resources are used iteratively*)
- Stakeholders:
  - [Communicating the Value of Competencies](#) (see "Communicating the Value" and "Scenario" sections) (American Council on Education)
  - [Learning and Working in the Digital Age](#) (Brookings Institution)
  - "Stakeholders and Roles" section below in this document
- Use cases and stories:
  - [Learning and Employment Record Use Cases](#) (National Governors Association)
  - [Learning and employment storyboard](#) (Velocity Network Foundation)
  - [Strategic Storytelling Toolkit](#) (Competency-Based Education Network)
  - [Use Case Primer, Landscape, and Template](#) (T3 Innovation Network)
  - [Use Cases for Enabling the Future of Skills-Based Hiring, Advancement, and Lifelong Learning](#) (T3 Innovation Network)
  - [Verifiable Credentials for Education, Employment, and Achievement Use Cases](#) (W3C)
- Data about credentials, skills, and employment:
  - [Credential, skill, and job data transparency](#) (Credential Engine)
  - [Jobs and Employment Data Exchange (JEDx)](#) (U.S. Chamber of Commerce Foundation)
  - [Making Sense of the Key Data Standards for Verifiable LERs](#) (Digital Credentials Consortium)
- Interoperability:
  - [1EdTech Digital Credentials](#) (1EdTech)
  - [Digital Credentials Consortium](#) (MIT)
  - [Encouraging interoperability to help learners in the digital credential marketplace](#) (Brookings Institution)
  - [Interoperable Learning & Employment Records](#) (Competency-Based Education Network)
  - [Global Interoperability](#) (Velocity Network Foundation)
    - [Velocity Network intro video](#)

- - ■ [Velocity Network wallet demo video](#)
    - ○ [Modeling Educational Verifiable Credentials](#) (W3C)
    - ○ [Verifiable Credentials Data Model](#) (W3C)
    - ○ [Verifiable Credentials Wallets for Learning and Employment](#) (JFF)
  - Inclusive and equitable design:
    - ○ [Equity Advisory Council Report and Recommendations](#) (Credential Engine)
    - ○ [Going digital: How learning and employment records shape access to quality education and jobs](#) (Brookings Institution)
    - ○ [Inclusive Design Principles for Learning and Employment Records: Co-Designing for Equity](#) (Digital Promise)
    - ○ [Skills Visibility: Why and How a Skills-Based Economy can be More Equitable](#) (Education Design Lab)
    - ○ [STARs: Skilled Through Alternative Routes](#) (Opportunity @ Work)

Analyze

Analyze *Existing Policies, Initiatives, Data, and Technologies*
- Align with goals and initiatives for access, attainment, quality, affordability, economic advancement, and equity to ensure continuity and impact
- Inventory related credential, skill, and job data
- Inventory current related processes, staff capacity, vendors, and technologies
- Identify necessary wrap-around supports and providers
- Define an action plan to get from the current state to support for beneficial use cases

Many states and regions are prioritizing the alignment of jobs and economic development initiatives with stronger talent pipelines. There has been an increase in programs aimed at helping people develop their knowledge and skills to adapt to rapidly changing economic contexts, for the benefit of all stakeholders and the economy more broadly. State leaders need to understand how LER initiatives can be connected to these and other priorities so that LER initiatives are aligned to shared goals and become more powerful than operating in silos.

LERs can empower people with meaningful information about what they know and can do, enabling them to advance on career pathways and contribute to economic growth; however, if LERs and the data they contain are not contextualized and supported across systems and processes, these opportunities will not be realized. Use cases and stories can serve as framing devices for understanding this contextualization, alignment with state goals, inventories of current related processes, systems, and data, and, importantly, clear definitions of the support and services people need to use LERs effectively and equitably. Action plans define how to bridge the gap between current and future state. Well defined use cases can help guide what's in and out of scope in action plans, and how the work can be phased.

Data about credentials, skills, and employment need to be connected throughout learning and employment processes. A state's data ecosystem from early childhood through the workforce

should provide learners, jobseekers, supporting agencies, and policymakers with public access to the information they need to make decisions about quality, relevance, outcomes, and current and future opportunities. This requires a strong data infrastructure using common definitions that facilitate connections and collaboration across agencies. Aligning LER goals with existing education and workforce data commitments, including linked open public data, will help reduce redundancies and costs in data collection and reporting as well as improving interoperability and efficiencies across systems.

States have multiple, often siloed and duplicative ways to inventory and collect information about credentials and skills of all types. Higher education agencies track postsecondary degrees and credit-bearing certificates, workforce boards track WIOA-eligible training programs that include certifications and apprenticeships, licensing agencies inventory state occupational licenses, etc. While these processes cover many credentials offered in a state, no one has a full view of credentials offered–for example, badges and credentials offered through employers are often left out of current state processes, as are non-credit programs at postsecondary institutions. Cross-state, national, and global linked open data about credentials can be combined from multiple sources to provide broader context. All of these different types of credentials issued by different organizations represent valuable learning that can be captured in LERs, so that people can share meaningful information about knowledge, skills, and abilities. Transparent data within these LERs, including linked open data in CTDL, provide connections and context to empower people.

Transparency is an essential goal for long-term scaling and sustainability of LER ecosystems as well as other important initiatives. Within that goal, a targeted data inventory can focus on the specific information needed to implement prioritized LER use cases. For example, an LER initiative might focus on connecting credentials, skills, and jobs for targeted in-demand occupations. And within that focus, employers could define the specific data that helps them match candidates to jobs. Postsecondary institutions could define the credit and non-credit programs that prepare people for those occupations. Connecting these different types of data, CTDL includes over 1000 terms that can be used to describe credentials, skills, and jobs; stakeholders can use whatever terms are necessary or relevant for specific use cases. CTDL does not include personally identifiable data that is needed for some use cases. A gap analysis can define the types of information needed for implementing the prioritized use cases, an inventory of current data (whether personally identifiable or not), and establishing minimum required and benchmark data for achieving specific goals.

A process and technology systems inventory can also focus on what's needed to implement the prioritized use cases and, overall, achieve short- and long-term LER goals. Processes and systems should be considered together to avoid silos or dead-ends; stories can help stakeholders visualize end-to-end support for the use cases across different systems. Consideration should be given to what processes and systems need to be built in-house and which can be outsourced. Interoperability principles need to frame the analysis, with concrete documentation of which interoperability principles apply to specific points in the processes, for example to combine data from multiple sources or to ensure privacy when data crosses between systems.

New wrap-around supports will likely be needed, and many existing supports can be adapted and evolved to achieve LER goals. For example, existing career navigation help and educational opportunity exploration can be enhanced with the additional data LERs provide. An inventory can help make visible the many supportive services that are available, and the prioritized use cases can target how to make these supports more effective for achieving LER-related goals. With new information and data coming from LERs, states will also have a better sense of what services are helping to yield positive education and employment outcomes, to inform enhancements. With equitable support structures, LERs can create new opportunities for individual agency, helping people understand their own skills, the value of their credentials in learning and career pathways, and how to connect to new opportunities.

All of these different types of inventory and analysis, in the context of clearly defined use cases, stories, and goals, will facilitate gap analysis that grounds the next steps and deliverables in one or more action plans.

Resources for analyzing
(*See also resources above; many of these resources are used iteratively*)
- Goals and initiatives:
  - [From Should to Will: Getting Concrete About the Benefits of Learning and Employment Records](#) (UpSkill America at the Aspen Institute)
  - [LER Ecosystem Map](#) (T3 Innovation Network)
- Credential, skill, and job data inventory and analysis:
  - [CTDL Benchmark Data Models](#) (Credential Engine)
  - [CTDL Handbook](#) (Credential Engine)
    - [Credentials](#)
    - [Skills](#)
    - [Jobs](#)
  - [Enterprise Data Strategy](#) (U.S. Department of Labor)
- Processes and technologies inventory and analysis:
  - [Credentials to Employment: The Last Mile](#) (Digital Credentials Consortium)
  - [How Skilled Credentials Can Help You Find Employees](#) (Society for Human Resource Management)
  - [Interoperability for Verifiable Learning and Employment Records](#) (Kerri Lemoie)
  - [LER Ecosystem Map SmartReport](#) (iDatafy)
- Wrap-around supports inventory and analysis:
  - [An Applied Science to Support Working Learners](#) (Stanford Graduate School of Education)
  - [Career Coaching Resources](#) (Markle)
- Action plan:
  - [Velocity Network Implementation Plan](#) (Velocity Network Foundation)
    - [Global utility layer](#)

Implement

Implement *New or Improved Policies, Initiatives, Data, and Technologies*
- Execute on the action plan
- Publish and make transparent and actionable all related credential, skill, and employment data
- Implement or improve related processes and technologies
- Establish effective and equitable wrap-around supports

Delivering rich, timely, accurate, reliable, meaningful information about learning and careers into the hands of learners, workers, educators, employers, policymakers, and other stakeholders is the vital "last mile" for LERs that empower effective decision-making. Systems, processes, and supports need to be implemented to meet LER goals. A well-designed action plan based on concrete use cases will lay out the steps.

Thanks to state leadership in related initiatives, processes that have been siloed and data that has historically been held in data warehouses are being turned into actionable pathways that connect learning and careers. Linked open data, which connects information from multiple sources using web technologies, is helping policymakers, practitioners, and opportunity seekers make more informed decisions about pathways to success. Publishing and making transparent credential, skill, and job data needed for LER use cases is a continuation and expansion of work already underway in most states. CTDL and the Credential Registry (which provides infrastructure for publishing and sharing CTDL data) offer a common language and trusted space to combine information from multiple sources to provide meaning and context for LERs.

Connecting credential, skill, and employment data to other data sets will expand the value of LERs and related processes. For example, ensuring that financial assistance and other supports, quality assurance, employment outcomes, and labor market projections utilize linked open data will enable more efficient and equitable real-time navigation along learning and career pathways.

Implementing these valuable data connections to support LER use cases will involve enhancing, supplementing, and in some cases replacing current systems and processes. Keeping an eye on end-to-end support for prioritized use cases can guide what systems need to be interoperable for different steps of LER development, issuing, collecting, and sharing.

Wrap-around supports must be in place for every step of LER rollout, scaling, and sustainability. These supports should be embedded in processes at secondary and postsecondary institutions, workforce development agencies, community organizations, human resource departments, and other providers in credential ecosystems. Supports based on inclusive and equitable design principles should ensure that LERs actually meet people's needs. LERs are valuable only to the extent they actually improve individual agency and enable equitable access to opportunities.

All of these different aspects of implementation, guided by well-defined use cases, should successfully connect LER goals to other initiatives and support sustainability.

Resources for implementing

(*See also resources above; many of these resources are used iteratively*)
- Action plan:
  - [Alabama Talent Playbook](#) (Alabama Talent Triad)
  - [Hire Standards: A Hiring & Advancement Playbook](#) (Learning Economy Foundation)
  - [Rethinking Community College Systems for a Skills-Based Talent Ecosystem](#) (American Council on Education)
- Credential, skill, and job data publishing:
  - [Credential Registry Handbook](#) (Credential Engine)
  - [Credential Registry LER Technical Guide](#) (Credential Engine)
  - [Open Badge Publisher](#) (Credential Engine)
- Processes and technologies implementation:
  - [Building the digital credential infrastructure for the future](#) (Digital Credentials Consortium)
  - [Enriching Open Badges with Credential Transparency: Guidance for Issuers](#) (Credential Engine)
  - [IEEE LER Global Review Draft](#) (Institute of Electrical and Electronics Engineers)
  - [Learner Credential Wallet Specification](#) (Digital Credentials Consortium)
  - [Verify Product Interoperability Prior to Procurement](#) (1EdTech)
- Wrap-around supports implementation:
  - [Digital Resilience in the American Workforce](#) (JFF)

Sustain

Sustain *through Enduring Commitment*
- Ensure sustainability through legislative, agency, and institutional policies that continuously improve LER processes, data, and technologies
- Establish processes for ongoing improvements
- Commit to durable infrastructure for enduring LER value

Leadership is critical to building a vision for change. It is also critical for ensuring that quality implementation of new ideas includes sustainability for the new systems and processes. Policymakers are vital to ensuring that LERs become a core element of education and workforce development strategies for the long term.

Policy can ensure that the work to support LER ecosystems is consistent and lasting. The commitment to LER systems and processes and the transparent data that underpins them needs to be embedded in policy and practice across P-20W systems to ensure sustainability, alignment, and impact. The value of linked open data about credentials, skills, and jobs will only grow as more LERs support larger and richer ecosystems contributing to economic growth.

Ongoing improvements in LER ecosystems involve not only technology evolution, but also related changes in processes and staffing. Investments could be needed in cross-agency collaboration and governance; staff capacity and professional development; business process innovation; maintenance and upgrading of technology; and standardizing and updating vendor requirements to make LERs and data transparency standard, regular, and expected practice.

Meaningful data for LERs should be a stated goal for all data management systems and vendors, and institutions, systems, and agencies should develop and implement processes that prioritize this. Practitioners should be trained in the best practice uses of linked open data to improve their operations and performance. Professional development should include training in privacy, equity, and human-centered practices.

The marketplace of providers, offerings, and platforms will continue to change. The credentials and skills needed by employers will continue to evolve. New use cases to address these needs will make the steps in this Action Guide a recurring cycle. But while specific needs will evolve, durable core infrastructure and portability of LERs over time must be a key consideration for the enduring value of learning and employment records that empower people with an understanding of their own skills and achievements.

Resources for sustaining
(*See also resources above; many of these resources are used iteratively*)
- Policy:
  - [Creating An Impact With Credential Quality And Transparency: A State Policy Toolkit](#) (National Skills Coalition)
  - [Digital Wallets and Selected Policy Issues](#) (Congressional Research Service)
  - "Policymaker Actions" section below
  - [Policy Briefs](#) (Credential Engine)
- Infrastructure:
  - [Guidance Signaling Expectations for Credential Transparency Sample Language](#) (Credential Engine)
  - [National Association of State Procurement Officials](#)

Stakeholders and Roles

Leadership matters. This truism is especially applicable when stakeholders are trying to act quickly and when there are many efforts, agendas, and players in the mix. Below are the leadership actions governors, agency chiefs, legislators, employers, and educators should take to leverage the power of LERs and data transparency to support their broader workforce development strategies and reach their goals. All of these leaders are critical to making equitable LERs a reality in your state.

Governors:
- Create a strategic vision for aligning education and workforce systems that include labor market information grounded in credential, skill, and job transparency and part of a broader P-20W data ecosystem
- Issue Executive Orders mandating the commitment to credential, skill, and job transparency for LERs through the use of linked open data, CTDL, and the Credential Registry
- Highlight the value and importance of LERs in State of the States and other important strategy-setting speeches
- Appoint leadership to create and follow clear objectives in the development and implementation of LER initiatives
- Build upon and utilize governance bodies, such as the P-20 Council, that are focused on learner lifespan issues, to ground their work in credential, skill, and job transparency (adopt CTDL, integrate credentials into P-20W dashboards, publish all credentials, skills, and jobs in the Registry)
- Hold agencies accountable for coordinating to integrate CTDL into all education and workforce programs and the LERs issued in those programs
- Promote skills-based hiring
- Champion the need for individuals to own and control their own LERs and use them in multiple contexts

Legislators:
- Allocate funding to support statewide adoption of LERs that are connected to linked open CTDL data in the Registry
- Mandate the use of CTDL to define any LER credentials issued in the state
- Require the use of global open standards for any LERs issued by state agencies, programs, and state funded institutions
- Advocate for state agency, cross-state, and federal data reporting aligned to CTDL to streamline data processes and sharing
- Allocate funds to provide ongoing support for the state's P-20W data system
- Set or require a state goal or target for attainment of credentials of value
- Define high-value credentials using rigorous skill, demand, and wage thresholds
- Define equitable credentials using rigorous required and benchmark data
- Develop protocols to provide academic credit for non-academic credentials
- Allocate funding for the inclusion of transparent, open skills data in LERs and the use of this data in processes for enrollment, transfer value, hiring, advancement, and other opportunities

Agency Leadership:
- Use CTDL to describe every credential (whether granted by K-12, postsecondary accredited institutions, non-accredited training providers, or licensing bodies) to promote transparency, analysis, and comparability

- Apply globally unique CTIDs to all credentials and skills so that they can be reliably referenced for understanding and analysis of the specific achievements in LERs
- Ensure that every credential, skill, and job is publicly cataloged using CTDL
- Require information about credentials and skills be part of program approval and program review processes
- Allocate funding for wrap-around supports that enable equitable access to the value of LERs across all stakeholders
- Create tools, resources, and communication measures to ensure that learners and workers, education/training providers, and employers are able to access and use the information about credentials, skills, and jobs, including indicators of their quality, found in the Registry and other systems and included in LERs
- Support technology and services vendors who provide capabilities for open standards-based LERs, including unlocking the value of linked open data

Business Leaders and Employers:
- Commit to using CTDL when describing the credentials and skills necessary for jobs
- Use linked open data to signal which specific credentials and skills are required or recommended
- Work with state LER initiatives to develop and communicate LER goals and use cases important to the business community
- Utilize CTDL data in LERs in talent acquisition, hiring, and advancement workflows, including skills-based hiring
- Include CTDL in all LERs issued
- Support technology and services vendors who provide capabilities for open standards-based LERs, including unlocking the value of linked open data

Education and Training Providers:
- Commit to using CTDL when describing the credentials and skills offered
- Publish all credentials and skills in the Credential Registry
- Utilize CTDL data in LERs in processes for enrollment, transfer value, and other opportunities
- Include CTDL in all LERs issued
- Implement processes to provide academic credit for non-academic credentials
- Support technology and services vendors who provide capabilities for open standards-based LERs, including unlocking the value of linked open data
- Allocate funding for wrap-around supports that enable equitable access to the value of LERs across all stakeholders

Policymaker Actions

Work with state leaders to understand the challenges of delivering credentials of value and quality in your state and learn how LERs and linked open data can help address those needs.

Identify and report on how LERs can improve the services of agencies overseeing K–12, workforce, higher education, licensing, apprenticeships, and other credentials and their related skills and jobs.

Incentivize state agencies, training and education providers, employers, and others to make information on all credentials, skills, and jobs in the state accessible through linked open data using a common language. Ask all agencies focusing on supporting the development of human capital to identify all data elements needed to support state LER goals.

Incorporate common and comprehensive public data around credentials and skills into the data systems of K–12, postsecondary, and workforce, and ensure that this information can be linked and shared to meet education and workforce goals. Ensure that quality and equity indicators are accessible to the public by publishing them in CTDL.

Create a census of all credentials available to state residents, identified, cataloged, and reported by type, provider, and type of provider, with additional data important to state LER goals.

Require that information about all credentials and skills delivered, issued, funded, authorized, overseen, or governed by the state be made publicly accessible through linked open data formats that support full transparency and interoperability, such as CTDL.

Utilize linked open data and CTID unique identifiers for credentials, skills, and jobs to ensure that data can be easily and reliably connected to other essential data.

Use Registry data in agencies' user-facing tools and portals to promote comparable information that can be linked to LERs.

Develop language to be used in RFPs that requires technology and services vendors to utilize CTDL and the Registry where appropriate.

Implement policies and legislation that provide for enduring credential and skill transparency as data to be included in LERs.

Include funding for LER-related activities in budgets for state agencies and programs.

History and Context for this Action Guide

This Action Guide is based on Credential Engine's State Roadmap and Action Guide for Transparency. Inspired by the Data Quality Campaign's essential elements of Statewide Longitudinal Data Systems and associated roadmaps, Credential Engine's Roadmap was designed to help states take action toward credential data transparency. Credential Engine developed the Roadmap, associated resources, and other policy briefs in collaboration with State Policy Partners, representing state agencies, workforce, education, data advocacy experts, and other stakeholders. These partners work together to build awareness, understanding, and demand for how policy can integrate credential transparency into education and workforce development state strategies. Their goals for the Roadmap include:

- Build awareness among state policymakers around the importance of credential transparency to their own state workforce and education goals and strategies;
- Elevate a common language about credentials for use in state policy;
- Increase demand among policymakers for credential transparency; and
- Provide specific actions policymakers can consider using to support integrating credential transparency into their larger human capital development efforts.

Ten steps in the Roadmap each include strategies that states can pursue, specific actions they can take, including policy actions, and examples from states' work on the ground. The associated toolkit organizes resources related to each step of the Roadmap. Credential Engine's state and regional partners have all used various aspects of the Roadmap to direct and implement their work. Each state uses different resources from the toolkit to meet their needs, and Credential Engine works with each state partner to identify needs and goals as states implement these strategies.

Success stories demonstrate data transparency progress in states. Credential Engine has also developed a self-assessment tool for states to evaluate their own progress on each step of the Roadmap, which can be used to share promising practices as well as determine areas of need. The toolkit, resources, and success stories are all continuously evolving to meet states' needs.

Data transparency is an essential foundation for interoperable, meaningful, human- and machine-actionable LERs. In fact, LERs are a high priority for many states using CTDL and publishing to the Registry. Therefore we have adapted this widely and successfully used State Roadmap to provide this Learning and Employment Record Action Guide. As with the Roadmap, Credential Engine and our many partners will continue to evolve these resources to meet changing needs.