

SEPTEMBER
2022



Walmart  org

HIRE STANDARDS

A Hiring & Advancement

Playbook

Powered by

Open Data Standards

Learning Economy Foundation is on a mission to translate leading edge technologies into transformative learning and economic systems that promote equity, mobility, privacy, and individual agency to radically improve lives throughout the world.

CONTENTS

INTRODUCTION

Open Standards Principles	4
Using Open Standards for Hiring and Advancement	7

1

Analyze and Plan

Summary	19
---------	----

21

2

Communicate Opportunities

Pilot A: Publish Job Postings Using Standard Fields	22
Pilot B: Use and Create Skills Frameworks	28
Summary	32

22

22

28

32

3

Acquire Talent

Pilot C: Accept Alternative Qualifications	33
Pilot D: Identity Masking	37
Summary	39

33

33

37

39

4

Train, Develop, and Document Skills

Pilot E: Issue Learning and Employment Records	40
Summary	42

40

40

42

GAPS IN THE TECH

43

CONCLUSION

45

APPENDICES

46

Appendix A: Examples of Relevant Standards	46
--	----

Appendix B: Who's Jason?	55
--------------------------	----

Appendix C: Open Standards Communities	56
--	----

Appendix D: Learning and Employment Records	59
---	----

REFERENCES

66

EXECUTIVE SUMMARY

Open Data Standards for Learning and Employment

The emergence of globally recognized standards can make pathways to quality careers accessible to a much broader segment of the workforce by surfacing the latent value contained within shared open data. The strategies and pilot ideas in this playbook give employers and education providers the tools and roadmaps needed to enable skills-based hiring practices, improve talent pools, allow for more equitable talent acquisition, and unlock opportunities for advancement.

Traditional hiring processes that rely on outdated analog systems, personal relationships, or biased algorithms too often exclude job candidates that have the skills and experiences needed to thrive in an increasingly global economy. In a skills-based talent marketplace powered by open standards, learners can be empowered to make informed decisions regardless of who they know or whether or not they have traditional qualifications, and employers can equitably source talent from a much larger and more diverse pool of qualified candidates.

What to expect from this playbook:

- Strategies for common talent acquisition issues using open data standards to improve hiring and advancement systems and practices
- Pilot ideas related to publishing job postings, creating and using skills frameworks, accepting alternative qualifications, masking identity, and issuing and accepting Learning and Employment Records (LERs)
- Simple reference to relevant standards and associated communities of practice

INTRODUCTION



ENVISION A FUTURE where individuals with any background or education level can skill-up into a family-sustaining wage, employers can improve the capabilities of their organization to meet new market demands, and workers are rewarded for taking steps towards greater prosperity. This future is realized by reimagining standard hiring practices, embracing open protocols, and advocating for digital records of achievements that serve the individual and their employers throughout an increasingly dynamic and lifelong career. **Only by embracing open data standards can we unlock this potential and enable skills-based learning and hiring, improve talent pools, allow for more equitable talent acquisition, and increase advancement through training.**

Employers are well positioned to drive demand for these innovations. What employers seek from applicants, and the strength of the signal they send to education providers, shapes the effectiveness of student preparation for the labor market. Employer procurement requirements can shift both internal technical decisions, as well as those of vendor partners. Similarly, policymakers can help to create positive downstream effects and improve the lives of their constituents. By adopting open standards, organizations universally signal their commitment to equitable hiring practices and economic mobility for all.

Benefits OF OPEN STANDARDS FOR HIRING AND ADVANCEMENT

Analyze & Plan

- Rich Insights
- Cost Reductions
- Less Vendor Lock
- Skills-based hiring

Communicate Opportunities

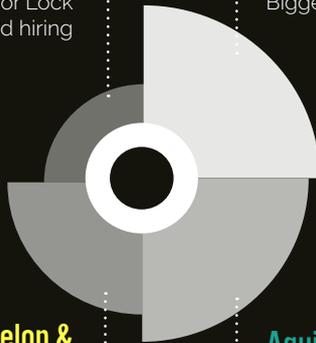
- More Diversity
- Less Data Entry
- Better Matches
- Bigger Talent Pool

Train, Develop & Document Skills

- Advancement
- Transitions
- Upskilling
- Reskilling

Acquire Talent

- Bias Reduction
- Performance
- Engagement
- Retention



Improving our shared data infrastructure will help to empower jobseekers with more information and control over how their personal information is used. Individuals will be able to use what they have learned, on the job and beyond, like a valued asset that they can "spend" as they pursue future opportunities.

Skills, when treated as currency, can help to accelerate a global economy of viable gig-work and dynamic career trajectories. In an economy where over one third of the workforce are freelancers (Upwork, 2021), workers will be able move between countries, regions, organizations, and industries with less switching costs like delays, fees, and loss of credibility.

In this playbook, you will learn how open standards can improve hiring and advancement practices for employers, candidates, and workers/learners over four cyclical areas: Analyze and Plan, Communicate Opportunities, Acquire Talent, and Train, Develop & Document Skills. First a strategy setting step, then creation and distribution of job postings, then hiring of candidates, and finally onboarding, training, and developing these workers. Within each of these areas of focus, you will find pilot ideas and strategies you can adopt that will help you prepare for the new systems and information flows likely to emerge as new protocols and open standards are adopted and scaled.

What is an open data standard anyway?

Open data standards are **agreements that establish a consistent way to create, use, and share data**. They are useful across all industries and enable vast improvements in data quality and collaboration. Imagine if every building you walked into used a different kind of electrical outlet and you had to constantly struggle with adapters that never quite worked right. A world built using open data standards is one that communicates, collaborates, and operates more seamlessly behind the scenes. It's like upgraded plumbing for our digital lives. For example, one standard featured in this playbook is *Verifiable Credentials*, which is a standard used to store and express an individual's credentials in a way that is secure, gives the user ultimate privacy control, and allows a computer to handle verification instead of a costly and fallible human resource department. Data stored in this universal specification can “plug in” to many applications and opens up a wealth of new use cases.



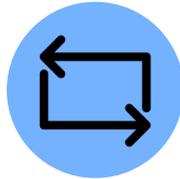
OPEN STANDARDS PRINCIPLES

The education and workforce open standards community helped inform this list of core principles for the industry. Many of these principles are also generally applicable to all open standards. See Appendix A for more detail.



Open

For all to use and ideally openly-licensed; no or low cost to use; royalty free



Consistent

Promotes a common understanding of the standardized data



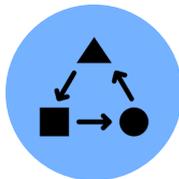
Portable

Enables portability to empower the individual; prevents vendor lock-in; can increase user agency



Openly Governed

Ideally: consensus-driven, publicly documented feedback & ratification process; collaborative; no or low cost to participate; sustainable



Interoperable

Enables exchange; able to be mapped to other standards; helps different organizations work together



Useful

Improves the usefulness of data, including comparisons and analysis



Structured

Machine- and human-readable, able to be parsed by computers and read by humans

OPEN STANDARDS FAQ

HOW DO YOU KNOW IF A COMPANY'S SOFTWARE USES AN OPEN STANDARD?

They might have a compliance badge on their website. Otherwise, ask them, and if it's not one of the standards this playbook mentions, you can provide this list or ask if it A) facilitates data sharing between organizations, B) enables portability of data for the individuals whom the data describes, C) is free or low cost to use, D) freely licensed, and E) ideally, developed on an ongoing basis by an open community.

CAN MY HR PROVIDER IMPLEMENT OPEN STANDARDS FOR ME?

Most vendors use proprietary models that make it difficult to transfer data in and out of the system. Proprietary APIs and web services to link systems together can only go so far when the standards being used have no intention of playing well with others. However, vendors compliant with interoperable standards such as those in this playbook may be able to help implement these standards.

HOW DO OPEN STANDARDS DIFFER FROM OPEN SOURCE SOFTWARE?

Open standards specify how data can be used across software. They facilitate using both open and proprietary software by making it easier for systems to work together without expensive and lengthy custom integrations.

WHAT IS THE DIFFERENCE BETWEEN OPEN DATA STANDARDS AND OPEN DATA?

Open data is data made available, typically on the web, for the public to use, such as government data like anonymized census information. Open data standards are just the formats being made available, not the data itself. Often open data uses open standards to enhance its usability.

WHAT IS INTEROPERABILITY AND PORTABILITY?

In a few words: Interoperability powers exchange, portability empowers people. An interoperable standard is distinguished by its compatibility. Interoperable data can be easily transferred from one standard to another, making exchanges between systems achievable with minimal or no loss of information. The portability of data refers to an individual's ability to move their personal information between platforms, as they would when switching employers.



*“Interoperability powers
exchange, portability
empowers people.”*

USING OPEN STANDARDS FOR HIRING AND ADVANCEMENT

The four steps at the right contain step-by-step pilot ideas for your organization to start benefiting from and preparing for open standards. Starting with the planning step, you can go through the other areas in order and come back to planning again in an iterative fashion to continuously improve your hiring processes. The first step, Analyze and Plan, sets you up for all the pilots.

1. ANALYZE AND PLAN

2. COMMUNICATE OPPORTUNITIES

Pilot Idea A: Publish Job Postings Using Standard Fields

Pilot Idea B: Use and Create Skills Frameworks

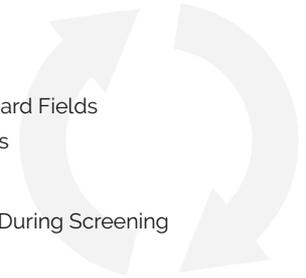
3. ACQUIRE TALENT

Pilot Idea C: Accept Alternative Qualifications During Screening

Pilot Idea D: Identity Masking

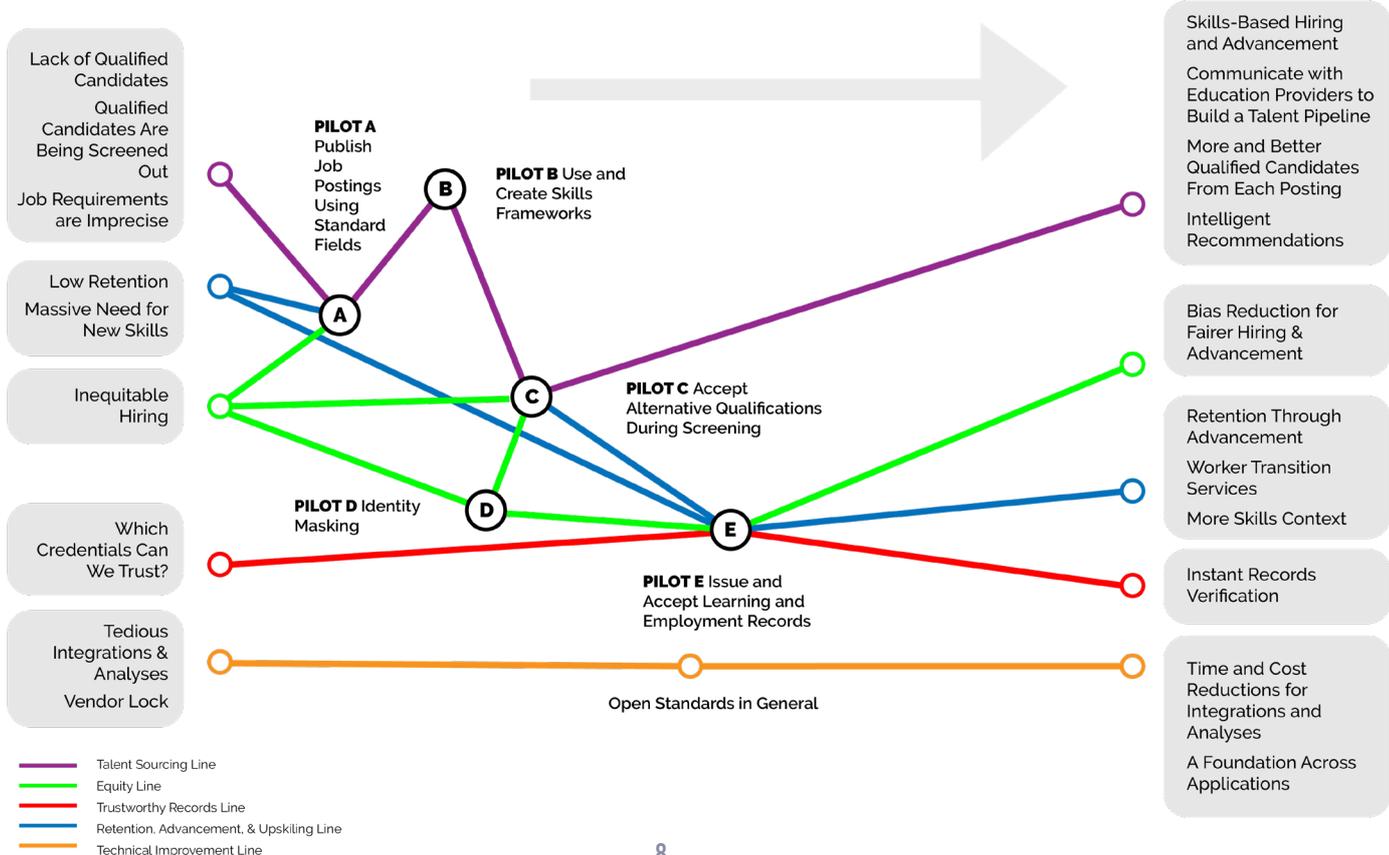
4. TRAIN, DEVELOP, AND DOCUMENT SKILLS

Pilot Idea E: Issue and Accept Learning and Employment Records



Scan the left side of the metro map for any challenges you are currently facing, represented by the starting stations on the map. Each of the colored metro lines represent a group of these challenges. You can traverse the metro through pilots to help reach benefits destinations. These five example pilot ideas suggest ways to implement or prepare to implement open standards. Use the map to find the pilots and metro lines that support your focus areas. For example, if you are struggling with inequitable hiring, we suggest the Equity Line which starts with Pilot Idea A, C, or D and moving to the right to the benefits. This can help provide complementary pairings of pilots. All of the pilots reinforce each other and become more complementary when deployed in concert, but realistically most organizations will not implement all at once. If you are experiencing low retention, you may want the Retention, Advancement, and Upskilling Lines. You can start at Pilot Idea A if you need to hire, jump to the talent sourcing line, and come back to the Retention Line to stop at Pilot Idea E. Or you can go straight to Pilot Idea E if you want to focus on incumbent workers.

PILOTS METRO MAP



1. TALENT SOURCING

CHALLENGES

Lack of Qualified Candidates

Over two thirds of North American employers struggle to find quality candidates (HireRight). Some of the most common problems in hiring and advancement include high turnover, lack of quality applicants, increasing talent acquisition costs, low promotion rates, low knowledge transfer from senior staff, and underskilled employees. Surprisingly, all of these factors can be impacted by an improved data infrastructure.

Qualified Candidates Are Being Screened Out

Ninety-four percent of employers hiring for middle-skills jobs feel they are screening out qualified applicants because they do not meet the exact requirements (Fuller et al. 3). Applicant tracking systems filter based on keyword matching that is not smart enough to understand contextual evidence of a skill's presence or even to overcome unexpected formatting. As a result, many candidates stuff their resumes with keywords from the job description that may not be an accurate reflection of their abilities.

Employers spend 7 seconds on average looking at a resume. This is not enough time to understand the applicants' real abilities, particularly for groups who lack the social networks to understand how to work the system and can reinforce systemic biases. Eligible but disadvantaged candidates are likely to use different words than employers to describe a comparable skillset, have nontraditional but valuable experiences, and make errors that send them to the bottom of the employability stack.

Digital Promise surveyed entry and mid-level frontline workers who have been most impacted by job disruption, including BIPOC, women, immigrant, and high-school-or-less-educated workers and found the most difficult concept to explain to employers was how their skills translate from one role to another (Cacio, et al. 17). They also struggled with explaining skills gained outside of work, through gig work, communication and social skills (Cacio, et al. 18). This may lead to a large volume of applications without qualified talent, poor selections, poor fit, and resultantly poor retention and performance.

Job Requirements Are Imprecise

Blanket filters that attempt to establish applicant quality with requirements such as degree earned or number of years of experience help employers refine what can otherwise be an overwhelming pool of applicants. But these requirements do not speak to the nuances of what a person offers or what a job really requires. Four-year degree requirements screen out a majority of Black and Latino adults (Lohr) and employers are noticing the effect. The Burning Glass Institute, a labor market analytics firm, found reliance on four-year degrees in job postings is declining. IBM and Accenture cut four-year degree requirements first for corporate responsibility and then as a mainstream practice, leaving them in less than half of their postings (Lohr). Yet many organizations lack an obvious path to more precise hiring without resource-intensive solutions.

BENEFITS of OPEN STANDARDS

Skills-Based Hiring and Advancement

Skills/competency-based education is a rapidly growing approach to reward what someone knows and can do instead of "seat time," which can be a boon especially to experienced learners. It can save them time and money and open up more inclusive paths to success, and it makes demonstrating competence both more detail-rich and more complex. It's creating new learning records that give detail about what a person knows, and can be a new tool for employers who are not getting what they need out of the traditional job description and resume matching process. Skills-based hiring means hiring for what someone can do, regardless of how they learned to do it.

Open standards are critical enablers of skills-based hiring. They make it possible to suggest appropriate skills to candidates and employers, enable candidates to store evidence and verification of their skills, allow employers to make more accurate requirements, and facilitate matching between candidates and employers. All of which require open standards for skills information that helps convey a precise shared meaning for each skill.



Open standards make it possible for AI to bridge the gap between candidates and employers. It can suggest appropriate skills that at once make it easier for employers to create more accurate job posting requirements, while giving potential employees the confidence to know they are applying to positions that they are qualified for. It also enables candidates to store evidence and verification of their skills, further streamline and substantiate the process, and facilitate better positioned matches between candidates and employers.

More and Better Qualified Candidates from Each Posting

Candidates who can easily gather, filter, and review job descriptions that have a standard and consistently-ordered set of fields can take in more opportunities and find a better fit. These fields will enable result filtering that is more Amazon-caliber, so job seekers can whittle down millions of postings to their needs and preferences with more options than are currently available on most job boards.

Communicate with Education Providers to Build a Talent Pipeline

Job seekers aren't the only ones who don't get clear

signals from job descriptions. Education and training providers who would like to teach relevant material need to know what is needed across employers. They rely on labor market information generated from job descriptions. This information suffers when job descriptions are inaccurate, have missing information, and are hard to process because their formatting is all custom. Open standards will directly increase data quality and quantity, making it easier to communicate employer needs (demand) to education and training providers (supply).

Partnership with local, regional, or even online training and education providers can create a supply chain called a talent pipeline. Sending a big signal, either from a large employer or a group of employers, is essential for motivating providers to update curriculum. Small and mid-size employers can achieve scale by working together to send an aggregate demand signal of what their hiring requirements are, for example, as a published summary list that education providers can reference. This interorganizational collaboration is expedited and made sustainable when each organization stores their hiring data in ways that map to one another without significant manual work.

2. RETENTION, ADVANCEMENT, AND UPSKILLING



CHALLENGES

Low Employee Retention

Retention was a top workforce management challenge even before the pandemic. A sweeping talent shortage is expected to be exacerbated by the skills gap, which will make it harder to fill positions left open by low retention. Employers used to hire almost exclusively from within by training and promoting their employees; now they skip those costs by hiring largely from outside the organization (Cappelli). Almost all hiring is for existing positions, and most of these are opening because of voluntary turnover (Cappelli).

Massive Need for New Skills

Fifty percent of employees will need reskilling by 2025, according to the World Economic Forum. In that same time period, skills demand will shift from physical and basic cognitive skills to technical and social/emotional skills (Bughin). The length of time a given skill is useful is shrinking rapidly (Brown and Thomas). Compounding these trends, the time it takes to close skills gaps with traditional training has increased by 10 times in 4 years (IBM Inst. for Business Value 2). IBM recommends three strategies to combat this: personalized learning to better understand a person's current skills and forward path, high transparency of skills throughout an organization, and partnerships with training providers and others outside the organization.

BENEFITS of OPEN STANDARDS

Retention through Advancement

Top factors for increasing retention include recognizing employees for their achievements, and enabling internal mobility between positions (SHRM). With rich data stored about what each individual can do, searching internal candidate pools for resourcing, upskilling, advancement, etc. becomes possible. Employees can be notified automatically when they only need some training to be eligible for a higher position. They can be rewarded for obtaining more experience and for having already obtained skills that they can now prove. Ninety-four percent of employees would stay with their employer longer if there was investment in their learning and development (LinkedIn Learning).

Employers who often hired candidates who are traditionally screened out by hiring processes found they were more than a third less likely to face hiring shortages, and these employees performed the same or better than peers in all six areas measured by the Harvard Business Review, including work ethic, attendance, and engagement (Fuller et al.).

More Skills Context

As requirements change and new skills are sought from candidates, providing more detail about each skill can help candidates understand exactly what you are looking for and assess if they are qualified, if the skillset is not what they are interested in, or what further training they need. Precision here can flow through the “talent supply chain” to sources of talent (education providers) so they can align with you.

Worker Transition Services

Services to smooth employee transitions to new roles benefit from records that clearly indicate a worker’s history. Data portability for workers and learners means that they can share what they learned or earned in one place with the next. One of the biggest changes organizations will make in response to changing skills needs will be hiring more freelance and temporary workers. These workers face frequent role transitions and can be disadvantaged by having to prove their qualifications again and again. This type of service for all types of workers can also boost your brand reputation, similar to tuition assistance programs.

3. EQUITY

CHALLENGE

Inequitable Hiring

Employers need resources to reduce the influence of protected characteristics such as age and ethnicity, plus other factors like elite education and company affiliation (as a mark for or against a candidate), which can often effectively segment candidates by group. Preference for candidates with shared hobbies and interests to the hiring manager is also a surprising but significant problem (Cappelli). Other biases that confound fair hiring include the primacy effect (the first person you interviewed) and the halo effect (what is beautiful seems good), either of which can contribute to unfair outcomes.

Before the hiring manager sees the candidates, the wording of job descriptions themselves affect who applies. According to a study of U.S. professionals, women will hold back on applying for positions where they don't meet all the requirements, even ones that are preferences (Mohr). On the other hand, men will typically apply when they meet 60% of the requirements, and as a result, there are often fewer female candidates for an open position. The fundamental issue is that without a better way to advertise and classify realistic job needs, both men and women will miss potential opportunities because they are uncertain if they qualify and don't want to waste their time. Additionally, as mentioned above, educational requirements can have huge impacts on which racial and ethnic groups are eligible, without necessarily doing a better job of filtering who is capable. The accessibility of the job search and application process also carries weight in who ends up applying. As an example, online interviews may enable a more diverse candidate pool. These are some of a web of factors that impact equity in hiring.



OPEN STANDARDS FOR EQUITY

Reduces Bias and Supports Equitable Practices

Bias is complex, insidious, often camouflaged, and easily compounds. Technology solutions cannot be implemented successfully without multiple stakeholders' participation, including underrepresented populations, community-based organizations, and designers. All technology, including standards, is a double-edged sword that can serve to narrow or widen gaps between groups of people. Introducing a new technology puts those who are less technically literate behind while they learn or remain blocked by the new tools. Those who lack access to devices and broadband are also disadvantaged the farther processes move from the analog, especially if analog options are abandoned altogether. For example, if an employer requires a mobile app to interact with job seekers, people who do not have a smartphone are left out. When new technical improvements to a process are viewed empathically through the perspectives of disadvantaged users, particularly by including them thoroughly in the process of designing and creating it, it stands a much higher chance of helping instead of harming those users. Universal design and user-centered design are helpful approaches. The key obstacles section of Brookings' Learning and Working in the Digital Age provides useful detail here (Goger 21).



Particular care must be taken with algorithmic approaches, which open standards substantially enable. The data used to create the algorithm and the program's results must be carefully monitored. It is likely to amplify existing biases if not managed and ideally audited, such as by a third party specialist organization. For example, Amazon's 2018 hiring algorithm used historical hiring data to predict who to hire next. Since most of the hires were men, it discriminated against females, and the system was scrapped. It's not impossible to instill modern sensibilities into an algorithm though. It requires careful curation of the data that it learns from.

If this hasn't scared you off yet, open standards have many advantages that can impact bias-related problems. Biases can be mitigated by consistent and careful interventions. The increasingly common practice of hiding candidate name, photo, and educational institution name can be facilitated by using special job seeker records that share information in highly customizable ways. The language in job ads can be reviewed by bias-reduction AI and consultants to better appeal to female and minority candidates. Standards make these job ads easier to process by machines. They also can make them much more accessible to job seekers. Standards can help job descriptions and career guidance systems for students and job seekers navigate the value of credentials alternative to typical 4-year degrees, which significantly opens doors to those who don't have or plan to obtain a bachelor's.



4. CANDIDATE RECORDS VERIFICATION/SCREENING



CHALLENGE

Which Credentials Can We Trust?

If you believe in education for all, the next step is recognition for all of that education, wherever it is obtained, and with any evidence that the learner can provide. With hundreds of thousands of credentials on the market, the challenge of processing and trusting that info scales up. When you also consider that 7 out of 8 employers have found misrepresentations in job applications, it's a big task to establish credibility (HireRight). There must be a way to understand and trust these more inclusive achievements at scale.

OPEN STANDARDS FOR TRUST

Instant Records Verification

Learners are earning new types of credentials that contain a live connection to their authentic status. Called "verifiable," they can be clicked on to determine if the credential is valid or revoked, expired, or suspended. This click also uses highly secure methods to inform you that the credential belongs to the learner and was issued by the named institution. This will cut out fraudulent claims on any credential stored in the standards that enable this. It will also work for credentials whose institutions no longer exist or cannot respond in a timely manner because the institutions are not needed to verify the credentials.

5. TECHNICAL

CHALLENGE

Vendor Lock

Issues around data can keep organizations using solutions they have long outgrown and stopped enjoying. The harder it is to get your data out of a system you'd like to leave, and the more potential for data loss that migration may cause, the less appetizing the switch to a new system is.

Integrations and Analyses Are Tedious

Many organizations have poorly integrated systems that require manual data entry or CSV file uploads and the need to make identical updates on multiple platforms. Working to integrate two or more systems' APIs may become so complex as to be unjustifiable, and purchasing a solution may be too expensive.

Data Cleaning Is Expensive

Related to these problems, the most time consuming and costly part of data analyses is data cleaning, which requires pulling from multiple sources, fixing inaccuracies, dealing with missing data, and getting the data into a workable format. It's hard to conduct strategic end-to-end analyses when data is not easily understood by computers.

OPEN STANDARDS FOR SUSTAINABILITY

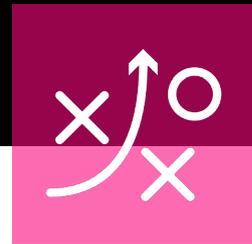
Time and Cost Reductions for Integrations and Analyses

Hiring was the top c-suite concern in 2019, yet only a third of employers monitored whether their hiring practices led to good employees, according to the Harvard Business Review (Cappelli). Having thorough information allows leaders to make confident and factual choices. The best data will include sources both inside and outside of your organization. This allows moving from small localized analyses within departments, teams, or orgs to analyses that reveal where interaction with other organizations, candidates, and workers is lacking or succeeding. Data-driven decision-making relies on the availability of timely data, and the smooth integration of applications that allow for needed data to move from point A to point B without turning into Wingdings. Data standards help provide canonical datasets in predictable formats, which make working between sectors, departments, organizations, and geographies a simple step and not a whole new project. This speeds up and increases the agility of information gathering, resulting in lower technical costs.

A Foundation Across Applications

Open standards mean you will ultimately have more choices of software because it's easier for developers to build applications using them. Similarly, they help smaller organizations get started without having to start from scratch.

1. ANALYZE AND PLAN



Strategic planning is the cornerstone of effective HR management, and the starting point for hiring. For this reason, it's the first step in our four-part playbook. Having a well-informed and thoroughly researched plan aligns HR goals with an organization's business and overall strategy. The result increases productivity, provides direction and resources, guides training and development, and anticipates and acts on opportunities and threats. The goal is to turn knowledge into a real, actionable plan that will produce measurable results. The key is having the kind of data that open standards make available. Because planning is a first step, incorporating a wide range of information into your strategy allows you to consistently re-evaluate, account for change, and make continual improvements.

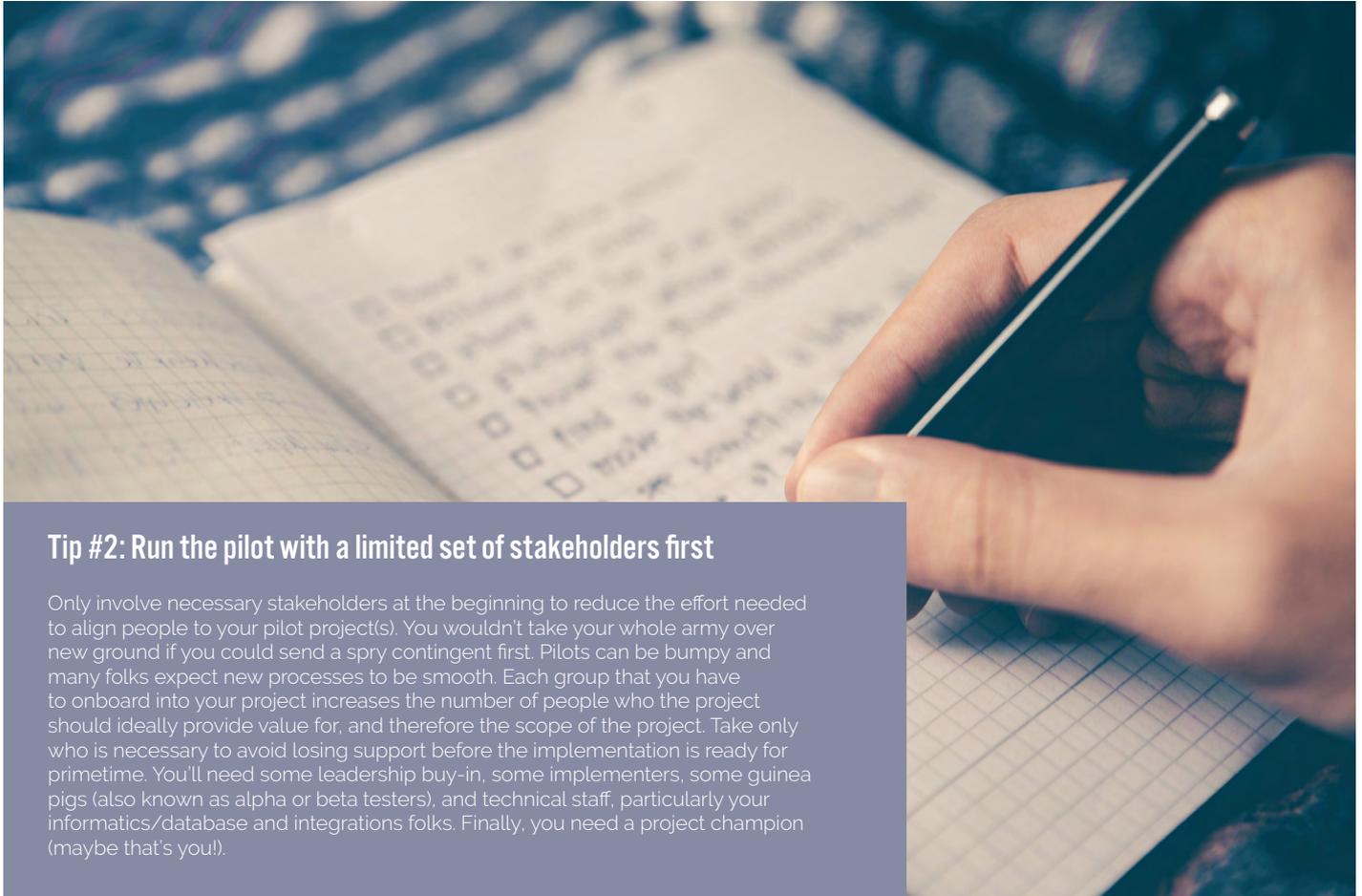
Overview of Open Standards Pilot Ideas

Open standards in HR are changing rapidly to respond to jolts in education and workforce from Covid, which catalyzed remote learning and working. To help you gain the benefits of open standards in your organization, under each major section of this playbook are a few pilot ideas you can implement that prioritize quick wins with small costs and use tech that's available now. They include example metrics

for each pilot. Each pilot can be done independently of the others but will maximize concert. You can use the above infographic to prioritize the pilots that support the empowering benefits on the left hand side that you'd like for your employees and applicants. The following tips can make these pilots their most effective.

Tip #1: Set intentions

First, set one or more intentions you'd like to accomplish using the benefits and metrics sections of this playbook as inspiration, like increasing hiring, lowering turnover, or upskilling. Link them to your organization's OKRs or other high-level objectives, set a project scope, determine key stakeholders, and set a rough timeline. In other words, treat any changes you'd like to make to your hiring and advancement routines with all the respect of a proper project and change management process. This pilot should act as a proof of concept.



Tip #2: Run the pilot with a limited set of stakeholders first

Only involve necessary stakeholders at the beginning to reduce the effort needed to align people to your pilot project(s). You wouldn't take your whole army over new ground if you could send a spy contingent first. Pilots can be bumpy and many folks expect new processes to be smooth. Each group that you have to onboard into your project increases the number of people who the project should ideally provide value for, and therefore the scope of the project. Take only who is necessary to avoid losing support before the implementation is ready for primetime. You'll need some leadership buy-in, some implementers, some guinea pigs (also known as alpha or beta testers), and technical staff, particularly your informatics/database and integrations folks. Finally, you need a project champion (maybe that's you!).

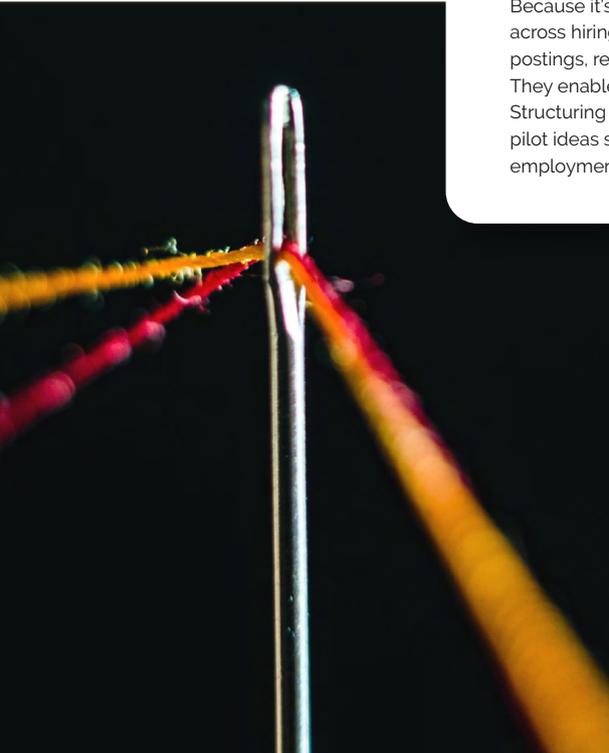
Tip #3: The red thread is skills

Comparing a resume with a job description can be done without the friction of manual comparison by using open standards to more seamlessly use data from different sources. Advanced analytics can compare what a candidate can really do with what an employer really needs. This is accomplished by breaking down resumes and job descriptions into precise skills and conducting skills and behavioral assessments. Skills and competencies, which will be referred to going forward as "skills" for convenience, include what a person knows and can do as well as work tasks and activities. These innovations can produce a more precise person-job fit, empower nontraditional candidates, and diversify hiring.

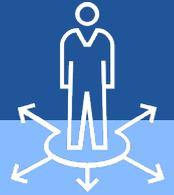
Because it's so valuable, they say data is the new oil. Since they make up the fundamental unit of data across hiring and education, skills are also this new oil. Skills appear within and can translate between job postings, resumes, individuals' profiles, performance data, syllabi, training content, and other documents. They enable the qualification of matches between people and jobs, for example, such as a 90% match. Structuring skills data using standards makes these translations and comparisons possible. The following pilot ideas show how you can use skills data in job descriptions and records of worker learning and employment.

SUMMARY

- Employers can influence education providers, tech vendors, and policymakers with a commitment to open standards
- Open data standards unlock information crucial for strategic planning and empower employees and applicants with their data
- They facilitate efficient analyses and integrations, reduce vendor lock, and improve hiring outcomes
- See which of the five suggested pilot ideas leads to outcomes that meet your goals
- To make these pilots most effective, set your intentions at the start, limit your first set of stakeholders, and use skills as the fundamental unit of data for translation between documents



2. COMMUNICATE OPPORTUNITIES



This is the second step in a general hiring and advancement process. In step one, Analyze and Plan, you have identified an upskilling, re-skilling, advancement, job, or other need. Now comes the process of determining minimum and preferred requirements for the opportunity. Then there is management approval, refining, creating a plan, writing a posting, setting up an application process, validating requirements, revising, distributing it across channels, and engaging in a search process. The order of these steps may be fluid or strictly defined. The output is an opportunity that has been shared, like a job posting. Open standards can open up the talent pool for these opportunities, make each posting more effective, reduce data entry, and create talent pipelines with education and training providers.



PILOT IDEA A: PUBLISH JOB POSTINGS USING STANDARD FIELDS

In our introduction, the infographic listed ways to empower employees and job seekers with pilot ideas that could support those outcomes. This is the first of those pilots. You can take your existing job descriptions and format them into a standard set of fields. Take your existing job descriptions and compare them to the U.S. Chamber of Commerce Foundation's [Job Data Exchange](#) (JDX) standard. There are many fields in the standard that house details about the job which are frequently excluded from job postings, like whether the job is temporary or permanent, whether

citizenship is required, etc. The beauty of using these is in including them even when the answer is “not required” or seems obvious by context. Including them as a matter of routine in a structured format makes it easy for the jobseeker to get answers at a glance. Instead of relying on a field’s absence to communicate it’s not applicable or required, including a routine set of fields and specifying information for each one chops through ambiguity. It will take coordination to get all these fields, but many of them will be very easy to add in bulk, like the address of the job site and a description of the hiring organization. It’s incredibly valuable for a candidate to see a description of the hiring organization to get a feel for the culture and focus without having to look the organization up first.

This standard is being developed in tandem with an effort to streamline employer hiring reporting requirements by the Chamber of Commerce Foundation and the Jobs and Employment Data Exchange ([JEDx](#)), an initiative promoting employer adoption and implementation of data standards for jobs and employment records through a public- private, multi-state data trust. JEDx will transform how employers share data with government agencies, enable new talent analytics, and empower workers with employment records. This should reduce the burden of having to submit separate and custom reports in each state and for each agency. There will be an overall compatibility between the reporting standards and the job description standard. This [report](#) by JEDx provides detail on using standards for employment and earnings records.

Job Title

Junior Cybersecurity Specialist

Employer Name

ACME Cyber

Employer Overview

Blake Lee revolutionized cybersecurity in 1999 when he discovered and prevented never-before-seen cyber threats on municipal energy utilities. He founded the ACME Cyber 1999 to defend infrastructure across industries. Join our state-of-the-art cybersecurity team with a culture of intellectual curiosity and responsibility. We have 6,000 employees across six counties of operation.

Job Summary

ACME Cyber, inc. is looking for a junior level cybersecurity specialist to support corporate and client contracts in our Seattle, WA locations. You will be a critical member of a highly-skilled, adaptive cyber team that carries out defensive vulnerability research.

Job Location

Seattle, WA

Job Location Type

Telecommute

```
t": "http://jobdataexchange.org/jdxcontext.json",
: [

"gid":
dataexchange.org/jdx/pp/resource/f0a23159-e3c3-43df-
599d0",
"@type": "jdx:Organization",
"email": "info@acme.com",
"hasJobPosting":
dataexchange.org/jdx/pp/resource/b9fc49d4-1344-4cb4-
7b77e",
"jdx:employerOverview": {
  "en-US": "Blake Lee revolutionized cybersecurity
he discovered and prevented never-before-seen cyber
municipal energy utilities. He founded the ACME Cyber
nd infrastructure across industries. Join our
-art cybersecurity team with a culture of
curiosity and responsibility. We have 6,000
ross six counties of operation."
},
"jdx:industryCode": {
  "@type": "AnnotatedDefinedTerm",
  "termCode": "541512"
},
"schema:address": {
  "@type": "schema:PostalAddress",
  "schema:streetAddress": "",
  "streetAddress": "123 Acme Way"
},
"schema:legalName": {
  "en-US": "ACME Cyber"
}
}
```

In this example job posting, the version that humans read (left) can appear with any design and layout. Underneath, each piece of information is stored in such a way that computers know which piece is which, so it can compare them between postings or from a posting to employee data.

Benefits for Jobseekers

Easy Reading

When a posting ends up as a single long paragraph or a series of formatting glitches, jobseekers may just skip it. It's also not fun to search for a specific topic, like work hours or salary, within hundreds of postings when that topic could appear anywhere in the posting, like a recruitment Where's Waldo?. Use the same set of fields and names for those fields, and keep them in the same order in your postings so that they can be quickly skimmed.

Sophisticated Filtering

For candidates, searching for a job is often highly time consuming, stressful, and overwhelming, taking place across numerous platforms and countless postings. Yet there are more precise search filters on the average department store website than on any of the major job boards. Filters that do exist, like "remote work," are unreliable, often only providing those jobs where the poster specifically checked a box, so to speak, and leaving out the majority of results in which "remote work" is mentioned in the description body.

Critical Details Are Present

For many people, a job's proximity to public transportation, the regularity of hours, the schedule, health benefits, the

required financial outlay for clothes or devices, or citizenship requirements are make-or-break factors. Yet this information is rarely all present. Often a detailed description of the hiring organization is missing or exists only as a single sentence. Jobseekers want to understand company culture, and they won't get it from a brief one-liner. Additionally, critical big picture information, like career progressions, are largely missing. Candidates want to know if a position is a step in a ladder to management. A great example of this is McKinsey's experience-based job progressions research. Organizations can spark candidates' dreams by sharing how a position will prepare them for internal advancement or even another career.

Clear Skill Requirements That Include Proficiency

The classic example of an unclear requirement is "good communication skills," which varies widely in meaning between roles and is a near-universal requirement. Is it public speaking, conflict resolution, customer service? What qualifies and quantifies good? Sometimes an educated guess can be made from context, but often it's not clear. Even for technical skills, it's often ambiguous whether an advanced level is needed upon hire date or if it's more flexible and there's a good opportunity to learn on the job.

When job descriptions, worker records, and worker performance data are stored in standards, organizations can work backwards to see which skills were most associated with performance on the job, taking the guesswork out of the next batch of job descriptions. Organizations with less capacity for their own analyses can benefit from "skill and competency frameworks" from professional organizations, similar companies, labor market information providers, and other sources. To influence the development of this standard, you can participate with HR Open in what fields are added and more.

When standardized job descriptions are combined with structured data for skills/competencies (see next pilot, Use and Create Skills Frameworks), AI tools

that help translate between skills (see Pilot Idea C: Accept Alternative Qualifications), and a network of users providing structured candidate and worker data (Pilot Idea E: Issue Learning and Employment Records), hiring and advancement will transform. Already leaders like IBM, Salesforce, Workday, Google, and Walmart are advancing from one or more of these innovations.

HOW TO MAKE JOB POSTINGS Accessible Through Skills

STRUCTURED, LINKED DATA FOR JOBS

1



JDX
Jobschema+

STRUCTURED, LINKED DATA FOR COMPETENCIES

2



Open,
machine-
actionable
competency
data

TRANSLATION AND VALIDATION TOOLS

3



Algorithms for
skill
and competency
identification,
translation and
recommendation

NETWORK OF JDX APPLICATIONS AND USERS

4



Employers,
educators,
workforce,
HRIS, ATS, LMS,
job boards

IMPLEMENTATION TIPS

CONTROLLED VOCABULARIES

Note that many of the fields have structured answers as well, known as controlled vocabularies. These are enumerations of the terms that are acceptable for each field. They make it far easier to sort job descriptions by fields. For example, the JobAgreement field has: Apprenticeship, Contract, Contract-to-hire, Employee, Externship, etc. Controlled vocabularies drastically increase the searchability of job descriptions by these options. If people just write in their own description for each field instead, it may require expensive machine learning to sort them out. Controlled vocabularies can be expanded to allow more terms as needs evolve. For example, [Standard Occupational Classification](#) (SOC) codes are used nationally and can be provided as a dropdown menu. Having people manually enter codes is a recipe for bad data soup.

VALIDATED REQUIREMENTS

Validate your requirements. See what skills successful workers have to help determine what a position needs. The American Institute for Research put out a great [resource](#) on validating skills through measurement and tracking. Get competencies into structured format and demarcate them as required or preferred. As a starting point, a free tool by Markle, the [Skillful Job Posting Generator](#), can create lists of required and preferred competencies for you using O*NET based on the job title you enter.

CROSS-FUNCTIONAL COLLABORATION

For fields that are harder to answer, build out the information flows within your organization. We find cross-functional collaboration is an unexpected positive outcome. Much greater collaboration is needed between hiring managers and recruiting managers to carry revised job descriptions through to publication.

TELL JOB BOARDS WHAT YOU WANT

Inform job boards that you are using or preparing to use standardized job descriptions and look forward to being able to publish them as structured data on job boards in the future. As job boards' customers, you can demand more from them for your business. Job boards should be able to receive a standardized job description and automatically map its fields to the job boards' fields for you, so that you don't have to do manual data entry. Note that until job boards begin to adopt a greater quantity of standardized fields, most of your structured data will still likely go into the description field. Only when the job boards support more advanced fields will jobseekers be able to use more sophisticated filtering.



Success Metrics for Job Postings

- Percent of job postings that **have been updated** with standard fields
- Average number of **new or enhanced fields** per job posting
- Number of fields that have **controlled vocabularies**
- Percent of fields out of total which have **readable formatting** when posted to each job board or other posting destination (postings that appear as a single giant paragraph would fail this metric for all fields)
- Percent of fields in a posting that are **used as search filters** by the job board (collaboration with job boards can help move this needle)
- **Time to export** a posting to a job board (to reduce laborious processes)
- Bonus: number of requirements that have been **validated with performance data**

PILOT IDEA B: USE AND CREATE SKILLS FRAMEWORKS

When writing job roles and descriptions, you don't have to reinvent the wheel. Skill/competency frameworks are collections of logically-related skills, such as a hierarchy of knowledge for CPR training. Often associated with licensure, employers have long referenced and relied on them to clearly describe bodies of knowledge, skills, abilities, work tasks, activities, and other statements of competency. You can use skills from these frameworks directly in your job descriptions and documentation, so that anyone can click on a skill to get more information. This tech is available now for free through openRSD and the Credential Registry. The University of Melbourne published the skill in this picture, Communicate Attentively, which is aligned to their national skills framework and occupation codes.

When selecting and creating frameworks, at an ideal minimum, for each skill you should have the following in openly-accessible human and machine-readable formats. Here's an example skill from the Education Design Lab to demonstrate, stored in CTDL and published in the Credential Registry:

Communicate Attentively



Skill Statement

Cultivate an ability to listen and communicate

Author	Keywords
University of Melbourne	communicate, attentive, active listening, listen actively, emotional intelligence, oral communication, empathy, mindfulness, clinical practices, mental health

Alignments

[Australian Skills Classification Framework : Core competencies - Oral Communication](#)

Details

Collection: University of Melbourne
Rich Skill Descriptors
Version: 1 ([show all](#))
Status: Live

Source: openrsd.com



Competency

Strengthen Relationships

Last updated: 2022-06-21T19:04:12.450Z



About this Competency

Basic information about the Competency

Individuals who can strengthen relationships add value in the 21st century workplace by creating networks through which they access and provide resources, information, and support.

Competency Category: *Collaboration*



Subjects and Keywords

Subjects and Keywords related to the Competency

Keywords

Collaboration 🔍

Relationships 🔍

Support 🔍



Connections

Relationships between the Competency and other data in the Registry

Part of Competency Framework

- [Education Design Lab 21st Century Skills](#)

Substantiating Credentials

- [Collaboration 21st Century Skills Badge](#)

Parent Competencies

- [Collaboration in the 21st century includes the capacity to work productively with different individuals and groups toward a common goal. Effective collaborators exhibit four core sub-](#)

Field Name	Field Description	Example from the Education Design Lab 21st Century Skills Framework
Skill Name	Short name of the skill	Strengthen Relationships
Skill Statement	Details the behaviors and capabilities required to perform a task including conditions as further defined within the metadata	Individuals who can strengthen relationships add value in the 21st century workplace by creating networks through which they access and provide resources, information, and support.
An identifier	Like a unique code	CTID: ce-bc81d5de-6356-4ffd-a93f-4b13bc851882
Parent Competency Framework	Competency Framework that this Skill Definition appears within	Education Design Lab 21st Century Skills
Author	Primary creator of the skill	Education Design Lab
Associations	Exist between this Skill Definition and other resources (including other Skill Definitions and stakeholders like employers or professional orgs). Using a standard association type is a good way to indicate the type of association (like "equivalent to")	Narrow Alignment: Building Blocks Model: U.S. Department of Labor (DOL) Develop constructive and cooperative working relationships with others.
Proficiency levels	Descriptions of levels of proficiency like advanced, intermediate, beginner	
Other competency metadata	E.g. date created, publication status	Date created, date updated, in language, licensing information, keywords, associated credentials



If you have your own skill frameworks, consider sharing them with the world. Publishing your skills is a credibility builder and service for students and job-seekers who aspire to work at organizations like yours. See Appendix A for Skill and Competency Framework Standards you can use.

Tools and Communities for Skills Frameworks

The Open Skills Network (OSN) community runs workgroups and pilots to discuss and inspire creating skills frameworks, like WGU's browsable collections based on the Rich Skill Descriptor (RSD) recipe for using existing standards to store skills. You can create and publish skills frameworks now using the openRSD tool created by Edalex, the Credential Registry, or OSN's OSMT tool (currently requires hosting your own site).

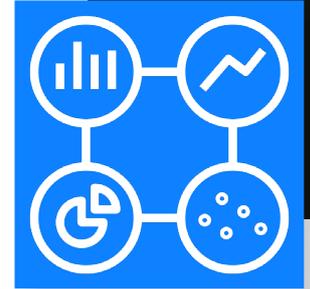
Credential Engine's Credential Registry currently hosts nearly a thousand competency frameworks ranging from O*NET and the College Board to the National Commission for the Certification of Crane Operators. This is particularly useful if you issue any training certificates so that you can link them to skills. Note that

a published skill should remain static online so that it can be used over the life of anything that links to it, like credentials or pathways, although new versions can be created. The underlying open standard in the Credential Registry, the Credential Transparency Description Language (CTDL), also now supports pathways between courses or programs, like the National Retail Federation Foundation RISE Up Pathway.

The Open Competency Framework Collaborative project from the U.S. Chamber of Commerce Foundation's T3 Innovation Network prototypes enables simultaneous searching across multiple standardized competency framework repositories. This will facilitate reusing other organizations' skill statements and linking to context including definitions for skills. The search service prototype already indexes a subset of frameworks from the Credential Registry, 1EdTech (formerly IMS), and D2L, with more on the way. Another useful tool from T3 for mapping between common standards and competency frameworks is the Data Ecosystem Schema Mapper (DESM) tool, which maps the fields between these and more competency standards.

Success Metrics for Skills Frameworks

- Number of **skills reused** from other sources like an in-house or external skill or competency framework
- Percent of **job descriptions or roles** that have linked skill definitions
- Percent of your **training materials**, courses, programs, or certifications that have linked skill definitions
- Qualitative **feedback from candidates and workers** about the experience of using linked skills
- Ability to develop **pathways and relationships** between jobs and training through linked skills



SUMMARY

- Open standards can open up the talent pool for your opportunities, make each posting more effective, reduce data entry, and create talent pipelines with education and training providers
- You can use skill and competency frameworks from other organizations to write your postings
- Creating standardized job postings will encourage cross-functional collaboration in your organization
- Validating the skills you seek from applicants anchors your hiring in facts
- Share your own skills frameworks with others on the open web for good karma and increased collaboration

3. ACQUIRE TALENT



Acquiring talent is a complex dance of recruiting active and passive candidates, receiving applications and inquiries, processing resumes, cover letters, and assessments, conducting interviews, screening, selecting, negotiating, offer letters, and onboarding. Pilot C offers a method of qualifications screening that will make your talent pool more diverse and reveal previously hidden qualified candidates. Pilot D prepares you to think about what information is better not to know about a candidate, in preparation for tech that can make that a reality.

PILOT IDEA C: ACCEPT ALTERNATIVE QUALIFICATIONS

Hopefully, the first pilot idea on standards that make sure you are hiring for what you really want has interested you and given you a way to rethink requirements around skills. In conjunction, it's worthwhile to think about degree and experience requirements. The number one barrier job seekers believe stops them from finding work is required years of experience (American Staffing Association, 2021). If you can turn down the knob on this one barrier, you can use the next steps to filter them more intelligently. This is a great opportunity to work with both your DEI team and your HR team as nontraditional candidates are shown to be loyal and high performers. Opportunity@Work (2021) found there are over 30 million Americans who currently work in low- and middle-wage jobs without bachelor's degrees but have the skills for jobs in a higher-wage category.

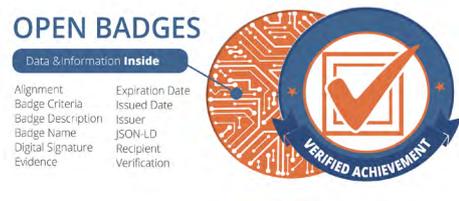
For a given open position, ask successful incumbent employees in the same position to list the skills they use on the job. See if there is a variety of terminology that is used just within your organization, and reflect on how that could vary within your talent pool. Asking older candidates, who are successful on the job, may especially show variation in their qualifications and starting years of experience. Another major barrier faced by job seekers is the filtering out of those with career gaps over six months. As mentioned earlier, only a fraction of organizations see if their hiring processes are producing the kinds of employees they want. See if this factor mattered for the performance of your current employees as well.

Nearly half of U.S. workers have alternative credentials like microcredentials, apprenticeships, and badges (SHRM, n.d.). A majority of employers believe including these in hiring decisions will increase diversity. Yet these credentials are so different and numerous that it's hard to know what each one means relative to a position's requirements. They are very poorly handled by applicant tracking systems, with only about a third recognizing them, and have no consistency in how they are accepted. In the future, job posting standards should contain logic for alternative requirements. For example, a position could require a bachelor's degree OR three years of experience OR demonstration of advanced ability with the required and preferred skills.

Low-Tech Tips

If you don't use HR systems, it's worth your consideration to update your company policies around alternative credentials. Use instructions like "Look for a degree OR three years of experience OR demonstration of the required skills." Provide ways to assess skills, like tests, and have a subject matter expert available to review candidate materials, like portfolios and alternative credentials. Over time, you can develop lists of qualifying methods of proof and criteria they must meet.

If you are working manually, train your staff to click on digital badges and credentials to verify them and get more information stored inside. This can prove a credential's authenticity and tell you what the candidate learned by getting the award. While many applicants will already have badges with this data, there will be more and more useful data-packed credentials coming up.



Source: [Openbadges.org](https://openbadges.org)

High-Tech Tips

To unlock this wider talent pool with the latest tech, you may want to start looking into ATS systems that use more sophisticated algorithms to match the data in resumes to the requirements of your job descriptions with a focus on matching skills. Skills matching requires natural language processing and should be inferential, using the context of the document (and baked-in pre-training on tons of human documents) to be able to understand synonyms and equivalencies for a given skill. Job posting standards, like HR Open's Job Data Exchange (JDX) and PositionOpening will enable links to skills so an applicant can click on a skill in a posting and be taken to a precise description of the skill and links to related skills. Algorithms will also be able to use this information.

Prepare for this logic by asking your ATS provider if it will be capable of filtering in these more advanced ways. Simple string matching will not be adequate. Having a whitelist and blacklist of ATS keywords is not sufficiently flexible or intelligent enough to handle 21st century candidates, many of whom will have applicable but more heterogeneous qualifications. Keyword matching creates artificial dead ends for everyone who doesn't use exact language. These newer algorithms are young though, and require heavy supervision to ensure they are not crystalizing unwanted biases.

If you are using HR systems for consuming applicant data, you will be able to ingest their data more losslessly so that it can go into your HCM systems without repeat data entry. For example, if you collect information on new hires' credentials, these could automatically appear in those form fields instead of HR staff having to manually fill them out. This will be possible when candidate information arrives with a neat package of standardized data that a computer can use. See the HR Open standards for examples.





Success Metrics for Alternative Qualifications

- Frequency/depth of **discussion around hiring requirements**
- Percent of roles with **alternative hiring requirements**, like skills and responsibilities
- A list of steps that you can take now to help your **ATS enforce changes** you are making to your job postings
- Questions and future **goals for your ATS provider**
- **How advanced is your skills screening algorithm**, from simple string matching to complex inference
- How many **types of digital credentials** can you ingest (intake their data without manual re-entry)
- How often you are clicking on or **opening those digital badges and credentials** to access detail

PILOT IDEA D: IDENTITY MASKING

Amazed, thrilled, shocked. These are the expressions on the judges' faces when they spin their big red chair around and see the singer they have just selected by hitting a buzzer. The auditions on *The Voice* captivate with sound alone - the judges can't see the talent on stage. Sometimes the singer looks unremarkable. Other times it's someone you might raise an eyebrow at. Some of the most promising appearances are actually duds. The judges' selection is all about talent, not appearances, and hiring can be too.

Digital wallets of verifiable digital credentials are the hiring equivalent of the big red rotating chairs by giving you the choice to obscure a job candidate while you evaluate them. Certain standards and design choices for digital wallets, resumes, and records allow selective sharing of a candidate's personal info. Like a physical wallet that holds cards and IDs, digital wallets hold a digital ID, certifications, and even currency. They let the holder choose what they share with whom.



Enabled by technologies including blockchain, a candidate can now share with you pieces of their personal information, academic, and employment history, which are as reliable as a signed original copy, without having to provide the full document. This innovation allows a candidate to “sing” without providing potentially biasing personal information, like their age, name, or gender. Digital Promise found users want the ability to control what personal data is shared with employers through their records (Cacicio et al., 2022). For example, many women are concerned about dates of employment that can give away their age and expose them to biases against older workers. This tech is tamper-proof and privacy-protecting.

Workday, IBM, Microsoft, Mattr, and Ping Identity are collaborating to create a model combining many of this playbook’s most cutting-edge standards for digital wallets, which will enable this granular and customizable way to share verified personal information. Down the line, more and more of your candidates will have these wallets and resumes that hold privacy-protecting records. You will be able to offer an application process that protects their identity as a perk, and as a way to guarantee that biasing information was not included in the hiring process from the candidate’s information that they sent to you. You will be able to receive their application without key information like name or name of college, for example, without any less reliability that they did attend college. Computations on data are possible, like turning an age into a binary - yes they are over 21 or no they are not.

How Can I Spin around My Big Red Chair?

You can get ready for these features, known as selective and progressive disclosure, by deciding how you can protect applicant identity. What information do you not need or actively want to avoid using in hiring decisions? You can also adopt recruiting software that provides automated de-biasing by masking identifying fields for the candidates in the system. If you are ready to implement, work with an education provider who is willing to issue their credentials as verifiable credentials. You can then choose to accept those credentials and other records from candidates that have categories of information removed through selective disclosure and/or gradually revealed through progressive disclosure.



Success Metrics for Identity Masking

- Number of roles for which **identity information is masked** during screening, or proportion of candidates who receive this implementation
- **Number of fields that are masked** out of a list of fields that you would like to mask
- Percent of applicants from **underrepresented groups** who successfully pass hiring manager screening when identity is masked compared to a control group

SUMMARY

- This step offers two ways to find candidates that might be getting systematically passed over in your current hiring process
- As the demand for skills will continue to evolve, and job seekers increasingly turn to alternative credentials, creating ways for qualified candidates to bypass strict degree and experience barriers will match many more opportunities to eligible workers
- Create logic for alternative credentials to be accepted in place of traditional ones
- Applicant tracking systems that screen on whitelisted keywords cannot keep up with the pace of change and variety of qualifications out there. Inferential skills matching algorithms can provide a long-term solution when well-monitored
- Get into the habit of opening and verifying digital credentials and badges for the wealth of info they will increasingly contain
- Identify which candidate attributes you want to keep out of the hiring process to avoid biasing your process to prepare for new record types that will enable customizable information sharing

4. TRAIN, DEVELOP, AND DOCUMENT SKILLS

This area includes Learning & Development, on the job learning and training, informal and formal skills acquisition, performance assessment, issuing certifications or otherwise documenting and communicating knowledge and skills, resourcing, creating and tracking career ladders or progressions, and planning and analytics around these activities. Read if A) you issue credentials to your workers or want to help your workers get more value from their achievements or B) you are interested in understanding and building on candidates' and employees' skills.

PILOT IDEA E: ISSUE AND RECEIVE LEARNING AND EMPLOYMENT RECORDS

If you would like to award credentials to your workers without having to ever answer the phone about whether you did in fact award that credential to that person, try **Learning and Employment Records (LERs)**. They're a type of digital credential that travels meaningfully and securely between organizations. You can

collaborate with a vendor who will manage the creation of a digital credential for you, like Credly, Canvas, or Accredible, or use an open tool like [Open Credential Publisher](#) (all these vendors are compliant with the Open Badge standard). Learners can share the credential or a set of them together to a verifier who might be another employer, the government, or an education provider. The credential is **verifiable** because they can check that it's valid (verification) in one click through a verifiable data registry. This **registry** can use any kind of secure storage including distributed systems for added benefits. All of these new types of records are stored not in traditional resumes or in single websites, but in learner-controlled wallets and soon new types of resumes.

Setting up your employees with **lifelong digital wallets** gives their achievement history a ticket to their next position. The U.S. Chamber of Commerce Foundation and Education Design Lab have projects in progress for helping create LERs from an individual's prior experience or education. The U.S. Department of Defense is expanding a military type of LER called Milgears across its services. Another type of LER called **Comprehensive Learner Records (CLR)** can hold many achievements including academic records. **Open badges** hold single achievements like an industry certification or a participation award. For more information on LERs and digital wallets see Appendix D.

FLEXIBLE REWARDS

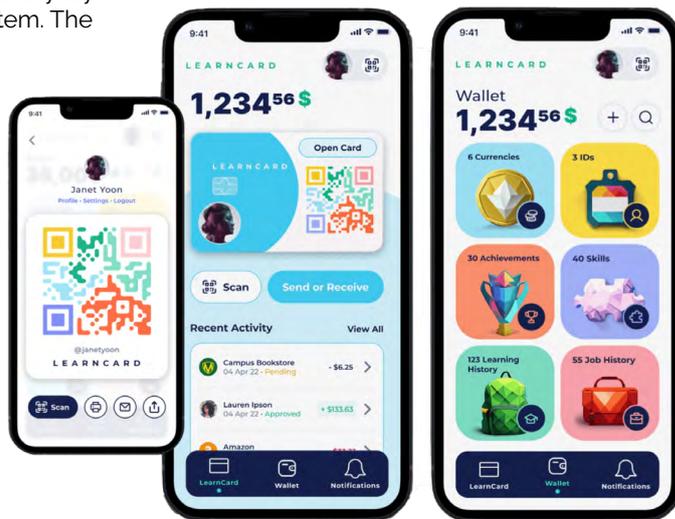
Issuing credentials to your workers is a huge step that unlocks rewarding informal learning that occurs on or off the job and makes up the majority of learning that occurs. An organization can incentivize more bite-sized progress with badges, certifications, or gold stars; the underlying infrastructure is agnostic. Even endorsements from managers and colleagues will have specific infrastructure to support them, like LinkedIn endorsements, but transferable across platforms. Employees can make a claim about their experience, which a manager could endorse. The virtue of decentralization makes these credentials modular, aggregatable, remixable, and shareable by the holder so that they can be used in completely new and exciting ways. It will enable innovations that make taking advantage of Learning & Development resources much more rewarding for learners.

THE LEARNCARD

Learning Economy Foundation's [LearnCard](#) brings LERs, wallets, and decentralized identity together to create a mobile safe deposit box for individuals to store and share their records and currencies. LearnCard can be integrated into any existing applications, providing a web3 digital wallet layer for existing web2 systems, including elearning platforms (e.g. EdX, Coursera, Udacity), HR and hiring applications, and learning management systems. It will also be modular and extensible by design, allowing it to connect to any layer one or layer two blockchain, cloud, or traditional server-based system. The LearnCard will become a standards-based global public utility for any and all edtech, HRtech, governments, institutions and learners worldwide that wish to utilize the power of digital verified credentials.

UNDERSTANDING AND ACCEPTING DIGITAL RECORDS

If you do not issue credentials, you will still see candidates come in your door with a rapidly increasing number of digital credentials like badges, CLRs, and military records. They will have rich metadata that you can use to verify the authenticity of the credential to ensure that it belongs to the holder and hasn't been tampered with or revoked. It will also reveal details that help you **validate** whether it meaningfully achieves any of your requirements through skills data and links to industry skill and competency statements.





Success Metrics for Issuing and Receiving Learning and Employment Records

- Percent of credentials issued as **LER-compliant digital credentials**
- Employee **records can be exported** to wallets that they own
- **Training completed** by recruiters and hiring managers on verifying and reading digital credentials
- LERs you issue are important in **your own advancement process**

Advanced:

- Employee **self-assertions are supported**
- **Endorsements** are supported
- **Decentralized identity** is supported
- **Progressive/selective disclosure** is supported
- Employee **usage rates of training programs** once LERs are implemented and communicated

SUMMARY

- If you grant awards, certificates, badges, or any type of credential to your workers, consider increasing their value by making them self-proving so recipients can take them anywhere without anyone needing to verify with you that they're valid and not expired or revoked. LERs are like a box your credentials can go in that make them portable and verifiable
- Maximize your impact by using verifiable credentials and wallets together to enable the pilot from the previous section around fine-tuned control of information sharing
- Recipients can then, in the future, share these new records to career navigation systems for highly personalized and scalable guidance. They will also be able to submit them in job applications
- Decentralized identity supports wallet technology by helping disambiguate between identities for information that will be shared across platforms. It also provides ultimate agency to users for their identity

GAPS IN THE TECH

In addition to emphasizing that technology cannot be used as a silver bullet against the many and complex problems in hiring and advancement presented here, there are some more concrete limitations to the level of development of this ecosystem of resources. The U.S. Chamber of Commerce Foundation T3 Initiative will be releasing a series of use cases for skills-based hiring. They lay out the same four overarching steps as this playbook, and identify failure points in the implementation of the technologies covered here, including:

- **Limited access to data** from labor market information, skills frameworks, and lack of structured data in general
- Standards and guidance for **skill descriptions** within skill frameworks
- **Algorithm development** and use is limited and particularly supporting resources and auditing for their ethical use

- **Interoperability** of data between and within organizations and platforms is lacking, more standards mapping will help
- **Assessment** development is lagging, as well as standards for them
- **Capacity:** employers HR providers, education providers, and individuals require the ability, resources, and motivation to invest in learning these technologies
- **Feedback systems** are needed to provide outcomes data at each step of the way and prevent disparate impacts

TOOL AND USABILITY GAPS: EMPLOYERS, HRIS, EDUCATION PROVIDERS, STANDARDS BODIES

Once tools for generating job descriptions follow open standards and encourage linking to skills within postings, users will need help understanding which frameworks to use and the relationships between frameworks and their contents. Searching across multiple skills frameworks simultaneously is possible with new tools under development, but choosing between them is another task. With nearly a thousand already in the Credential Registry, improved search and more complete descriptive data on frameworks is needed. Relationship metadata between frameworks and skills will be needed. NESTA crosswalked O*NET and ESCO for their research, for example, but no tool exists to do this at scale.

Gaps in the Tech

Badge and credential issuing platforms will need to adopt open standards so their credentials can be better understood and trusted. Their adoption decisions will inform how employers should open, view, validate, and ingest these credentials. Existing HRIS will also need to adopt standards and communicate the benefits to employers. Standards bodies should continue to lead on mapping fields between standards so applications can exchange information between information stored in standards. Within employer systems, tools are needed to track and share career progressions and data about how workers traverse them, with what skills, and to what effect. CTDL pathways are a start. On a technical note, a software development kit which facilitates working with JSON-LD would be useful for programmers who want to grow into using the format.

TOOL AND USABILITY GAPS: INDIVIDUALS

Individual learners, workers, and job seekers lack sufficient career navigation platforms that incorporate the available technologies to take someone from their interests to occupations to training to jobs that fit with that training. Accompanying tools could help them build resumes that directly tie to job descriptions, include verifiable credentials within their narrative, and ease the burden on the writer of translation into employer language. Tools for an employer to accept these futuristic resumes and records will need to be developed so that the rich metadata can be harvested and used. Wallets, career navigation, and other platforms for individuals will need to facilitate the records and resume sharing process in ways that increase data, digital literacy, and informed consent.

MITIGATION

Employers can mitigate the first category of failure by participation in using job posting standards and sharing skills data. Open standards are also the best and most sustainable way to combat interorganizational interoperability challenges in addition to sustainable data sharing agreements. Filling the gaps in standards development will be aided by their attention, feedback, and adoption. Algorithm development depends largely on the data available to it. That is a full-community effort to see the value of getting data into formats that algorithms can consume and use to serve us, particularly those who are beyond the reach of our counselors and human services personnel, who often are paired with populations too sizable for personal touch. For that, our community may benefit from digital and data literacy training and exposure to well-made consent-sharing user experiences and enforced policies that engender trust in how data will be used. Capacity, however, is by far the most significant of the issues. Successful implementations must put it in the center of their planning, for example, by tying an open standards effort to existing priorities for all stakeholders.

Usability gaps would benefit from high-level leadership to identify priorities and test out solutions. Sometimes a relatively-low-investment open tool will be enough to bridge the gap and complete a goal. Enabling the completion of a full use case that delivers value to both employers and workers/learners would be good target areas for building solutions.

CONCLUSION

If you believe in the power and benefits of open standards, we encourage you to start a conversation and explore how your organization can prepare for the future of hiring and advancement. We hope the strategies and tools outlined in this playbook help to empower employees, jobseekers, and learners and prepare them for an increasingly dynamic, globally connected world of work. At Learning Economy Foundation, we believe everyone should be provided equal opportunity to obtain personally relevant training and pursue a fulfilling career. By embracing open data standards and advocating for equitable hiring practices, we can help to ensure this future becomes a reality.





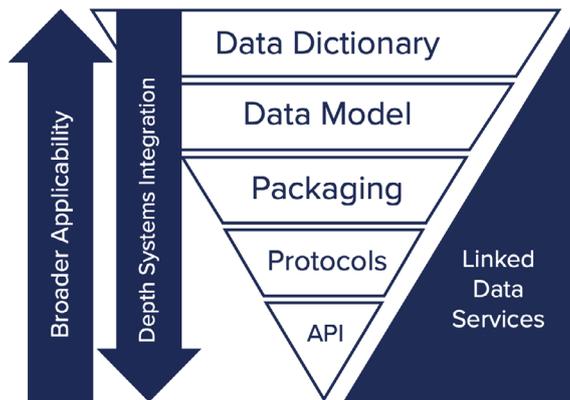
APPENDIX A:

EXAMPLES OF RELEVANT STANDARDS AND SPECS

All of these standards, specs, and data models improve the consistency, interoperability, quality, and usefulness of data. They are all machine- and human-readable. Almost all are openly licensed and governed, making it free to use them commercially and participate in their evolution. The upside down pyramid represents types of data standards and protocols. The top layers of the pyramid are most broad, versatile, and durable, while the bottom of the pyramid facilitates deeper and more specific integrations. Each type is described below.

DATA DICTIONARIES AND DATA MODELS

Most of the standards fall into this category. This category covers the definition of data elements, how they are grouped, and how they interrelate.



PACKAGING (SERIALIZATIONS)

File formats used for storing and transporting (packaging) the data, which the data dictionaries and models organize, are addressed in Appendix B: Who's Jason?

PROTOCOLS & APIS

The protocols and APIs layer moves data between applications or services. The most common protocol for moving data is the RESTful Application Programming Interface (REST API). This layer is important because it must be secure, fast, and fulfill the privacy requirements of your organization or locales. Open standards for protocols and APIs help reduce the number of custom APIs needed by being more versatile to add new objects for transport.

Source: U.S. Chamber of Commerce Foundation; CC BY 4.0 Jim Goodell.

GENERAL

- [Schema.org](#) is a collaborative, community activity with a mission to create, maintain, and promote schemas for structured data on the Internet, on web pages, in email messages, and beyond. Over 10 million sites use Schema.org to markup their web pages and email messages. Instead of creating your own schema for "Organization," for example, use Schema.org, which comes with a substantial number of well-built attributes that will be effortlessly mappable to other systems that use the same schema (Microdata, RDFa, JSON-LD).
- [U.S. BLS Standard Occupational Classification \(SOC\)](#) a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 867 detailed occupations according to their occupational definition. To facilitate classification, detailed occupations are combined to form 459 broad occupations, 98 minor groups, and 23 major groups.

JOB DESCRIPTION/POSTING STANDARDS

- [HR Open JobPosting \(JDX\)](#) defines a set of information about a job posting to be used to post a job for discovery. This includes structured information to improve search and match (JSON-LD, XML).
- [HR Open PositionOpening](#) contains details about a position opening, including requirements for the position as well as administrative information.

SKILL AND COMPETENCY FRAMEWORK STANDARDS

YOU CAN STORE SKILLS IN THEIR REPOSITORY

- [Credential Engine Credential Transparency Description Language ASN \(CTDL-ASN\)](#) In order to describe competency frameworks and [collections](#) of competencies in as interoperable a manner as possible, Credential Engine builds on an existing description language called Achievement Standards Network Description Language (ASN-DL). Credential Engine manages specifications for CTDL and full documentation is publicly available. You can browse nearly a thousand frameworks and 37K credentials in the [Credential Registry](#), which is continuously growing.

- [1EdTech \(formerly IMS Global\) Competencies and Academic Standards Exchange \(CASE\)](#) A standard for publishing machine-readable frameworks that covers learning outcomes, academic standards, competencies and skills, rubrics and performance criteria, enables linked-data relationships across items and frameworks, and hosts a [CASE Network](#) of this data. While initially adopted by K12, its higher ed and workforce use is growing.
- [D2L Achievement Standards Network \(ASN\)](#) is an open-access collection of curriculum objectives from education agencies, organizations, and governments across the globe.
- [OSN Rich Skill Descriptors \(RSD\)](#) are machine-readable, searchable data that include a skill and its context, providing common definitions for skills (content model which builds on CTDL and CASE).
- [MedBiquitous](#) standards are a set of competency-based standards for healthcare professionals that allow organizations to compile, compare, aggregate, exchange, and transfer competency-based education data.

READ-ONLY REPOSITORY - SOURCES OF SKILLS

- [O*NET](#) is a free, continually updated database of standardized descriptors for occupations within the United States. O*NET is published by the U.S. Department of Labor.
- [European Skills, Competencies, and Occupations \(ESCO\)](#) is a classification which identifies and categorizes skills, competencies, and occupations relevant to the EU labor market, education, and training.
- [SFIA Framework](#) A common reference for skills and competency for the digital world, used in over 200 countries (fee for larger organizations).

FOR COMPETENCY DESCRIPTIONS

This guidance applies to one or more fields of metadata that are stored within skills/competency data, which are stored in frameworks or collections in the above standards. These fields are the third, inner Russian doll in a stack. In general, make sure you are using a format for writing your competency descriptions, as opposed to writing them off the cuff, so that they can be more easily understood and compared by humans and machines.

- [IEEE P1484.20.3 Data Model for Shareable Competency Definitions](#) defines conceptual and logical data models for describing, referencing, and sharing competency definitions and frameworks of competency definitions and is intended to complement other standards that support interoperability of such data. This standard provides a way to formally represent the key characteristics of a competency definition, independently of its use in any particular context. It supports interoperability among learning and human resource management systems that deal with competency information and coordination among technical standards by providing a means for them to refer to common definitions. The standard can be extended through Shareable Competency Definition

(SCD) application profile schemas. This standard is expected to be available by the end of 2022 from the IEEE for a fee.

- [IEEE 1484.20.2 Recommended Practices for Defining Competencies](#) was developed to promote a common understanding for those involved in defining policies, standards, and data structures for competency definitions and frameworks. It discusses various approaches for developing competency definitions and frameworks and incorporates and promotes the principles of ethical development, definition, documentation, and reuse of competency definitions and frameworks. However, these recommended practices cannot replace the role of experts who have developed specific domain expertise that is invaluable to organizations developing specific competency definitions and frameworks. This standard is expected to be available by the end of 2022 from the IEEE for a fee and complements the above standard.
- The [ECampus Ontario Open Competency Toolkit](#) is a free resource published under creative commons with instructions on creating competency statements which reference performance criteria of your choosing.

APPLICATION

- [HR Open Application*](#) A method for candidates to submit personal and employment related information to an employer, typically with respect to applying for a specific job requisition. However, this may also be with respect to another type of candidate management solution that is not strictly or even at all related to specific job requisitions, e.g. a "talent community" (proposed, JSON, XML).

*All HR Open standards links are to the homepage. Additional documentation available with free registration.



ASSESSMENT

- **HR Open Assessments** is a set of schema for assessment providers to communicate with HR systems (recruiting, onboarding, LMS) (JSON, XML).
- **1EdTech QTI** facilitates the exchange and storage of assessment content.
- **Common Education Data Standards (CEDS)** streamlines the understanding of data within and across P-20W. See the Assessments schema.
- **1EdTech LTI** Learning Tools Interoperability (LTI) enables integrations for LMSs with content providers and tools. LTI's plug-in architecture works to securely connect applications as a single sign-on system (JSON).
- **Advanced Distributed Learning (ADL) SCORM** builds and track a learner's interaction with a course and connects between LMSs and other systems (XML, phasing out for other standards like xAPI).
- **AICC CMI Test Suite** nonprofit, membership-driven organization dedicated to helping the aviation training community. Currently collaborating on the xAPI (see Learning Management).
- **PESC Test Score** developed for applicants looking to take and share tests and for use by testing agencies, colleges and universities (and college/university systems), states/provinces (and state/provincial systems), application centers, high schools, districts, vendors, government agencies, and service providers.
- **IEEE LTSC & ADL xAPI** The Experience API records and transfers any imaginable learning experience data, including mobile learning, simulations, real-world activities, and wearable devices. xAPI uses Profiles to ensure semantic interoperability. The U.S. Air Force is using xAPI to maximize fighter jet training effectiveness (ADL, 2022) (JSON).

ABOUT THE CANDIDATE

- **HR Open Recruiting** includes specifications on Candidate, Position Opening, Search Document, and Search and Match. Good for transferring info from ATS to HRIS, position openings to job boards, etc (JSON, XML).
- **HR Open Resume/CV** defines a set of information about a person and their relevant experience, such as work history, education, and competencies (under development, JSON, XML).

INTERVIEWING

- **HR Open Interviewing** For interviews at any point in time in the worker life cycle, asynchronously, synchronously, online, by phone, face-to-face, or as multi-part interviews. The specification includes how to take the interview, interview questions, and how to process the results to improve communication between systems.

TRAIN, DEVELOP, AND DOCUMENT SKILLS

LEARNING MANAGEMENT

- [IEEE LTSC & ADL xAPI](#) (See prior xAPI entry and CMI5 (an xAPI profile for content used with IEEE P2881))
- [Advanced Distributed Learning \(ADL\) SCORM](#) (see prior SCORM entry's description).
- [1EdTech LTI](#) (See prior LTI entry's description).
- [A4L SIF](#) is fast data transport for education-related data. The data model is separate from the infrastructure so you can use this to transport credentials with any payload types (XML, JSON).
- [PESC](#), the Postsecondary Electronic Standards Council, hosts standards for higher education processes of which Course Inventory, Credential and Experiential Learning, and ePortfolio may be of interest for organizational learning and development (EDI, XML).
- [CEDS](#), the Common Education Data Standards Initiative, is a free resource which lays out a common vocabulary, data models, tools, and metadata to help education stakeholders understand and use education data.
- [1EdTech Thin Common Cartridge / Common Cartridge](#) provides a standard way to represent digital course materials for use in online learning systems and enables new publishing models for online course materials and digital books that are modular, web-distributed, interactive, and customizable.
- [IEEE Learning Object Metadata \(LOM\) 1484.12.1](#) A conceptual data schema that defines the structure of a metadata instance for a learning object is specified in this standard.
- [IEEE Learning Metadata P2881](#) builds on the IEEE 1484.12.1 standard but is explorative to new learning paradigms and modern technology practices (in development).
- [DCMI Learning Resource Metadata Initiative \(LRMI\)](#) a collection of classes, properties and concept schemes for markup and description of educational resources.
- [MedBiquitous Healthcare Learning Object Metadata](#) a standard way to describe learning activities and content, making it possible to maximize the value of content and connect to the broader community of health care educators.
- [1EdTech Content Packaging](#) exchange data between systems that wish to import, export, aggregate, and disaggregate packages of content.
- [Credential Transparency Description Language \(CTDL\)](#) includes classes like LearningOpportunity, etc.

WALLETS

These wallet standards and specs are of interest if you want to make your own wallet, but you may want to first consider using an existing wallet provider. This [report and market scan](#) released by JFF is an excellent resource on current VC-compatible wallet providers.

- [W3C Universal Wallet 2020](#) This specification describes a portable, extensible, JSON-LD wallet, supporting digital currencies and credentials.
- [MIT DCC Learner Credential Wallet Specification](#) builds upon ongoing standards work in W3C, IEEE, DIF, the Universal Wallet, and the LER specification. This wallet standard is less focused on currencies and more on linked-data skills.
- [European Blockchain Services Infrastructure \(EBSI\)](#) specifications span wallets, credential issuance, and identity, building on W3C VC, Verifiable Presentation, DID, OI DF OI DC, and more for diplomas, identity, social security, and beyond.

THE FOLLOWING CATEGORIES OF STANDARDS ARE USED BY WALLETS TO HANDLE CREDENTIALS

One of the frontiers in data management is allowing individuals the freedom to manage and use their employment and education information. If you want to prove that you have earned a diploma, whoever you want to prove it to has to check with your school. A truly portable diploma contains proof that is strong enough to stand on its own and eliminates the need to check with the school, which may or may not respond to the asker or even still exist. Since there is growing agreement that the robust Verifiable Credential specification is the best way to now make data portable, under this section the relevant standards are marked that support it.

- **CREDENTIAL FORMAT** The following formats all can contain credential data that can be held in a wallet and presented to an employer. Wallets accept some formats of credentials and not others, so check what the wallet can hold.
 - [W3C Verifiable Credentials](#) The critical specification for using digital credentials that are cryptographically secure, privacy respecting, and machine-verifiable. The spec is general to all uses of digital credentials including healthcare and financial data.
 - [1EdTech \(formerly IMS Global\) Open Badges OBv2.x](#) is the world's leading



format for digital badges. Open Badges is not a specific product or platform, but a type of digital badge that is verifiable, portable, and packed with information about skills and achievements. Open Badges are easily shareable on the web and social media. Open Badges 2.1, also known as the BadgeConnect API, is the latest version (not VC compatible, JSON-LD).

- [1EdTech Open Badges OBv3.0](#) This major upgrade will align to the W3C VC and CLR standards and is expected August 2022 (in development, VC compatible, JSON-LD).
- [1EdTech \(formerly IMS Global\) Comprehensive Learner Record \(CLR\) v1](#) (VC Compatible with Open Credential Publishers (OCP)) creates, transmits, and renders an individual's set of achievements, as issued by multiple learning providers, in a machine-readable format that can be curated into verifiable digital records of achievement (JSON-LD, REST, OAuth 2.0, HTTPS).
- [1EdTech CLRV2](#) is a new version of the CLR meant to align with W3C Verifiable Credentials Data Model, and the upcoming Open Badges 3.0 Specification (JSON-LD, in Development, VC Compatible).
- [MIT Blockcerts](#) uses the Bitcoin blockchain to issue, share, and verify credentials. It's aligned with Open Badges and decentralized identity (VC compatible).
- [ToIP Authentic Chained Data Containers \(ACDC\)](#) is a branch of the W3C Verifiable Credential specification which links credentials together and improves speed, size, security, and privacy.
- [IEEE Integrated Learning Records \(ILR\) Recommended Practices](#) provide best practices for learner records related to identity, trust, open ontology references, and verifiable assertions.
- [ADL & IEEE P2997 Enterprise Learner Record Data Model](#) harmonizes the structure of learner record metadata generated and used by education and training activities. This will facilitate the creation of portable learner records that can be shared across DoD organizations

- **PROTOCOLS & APIS**

All of these protocols are VC compatible.

- [Credential Handler API](#) (CHAPI) is an API which helps websites request users credentials from user agents and to allow credentials to be stored for further use.
- [Verifiable Credential API](#) (VC API) provides a data model and HTTP protocols to issue, verify, present, and manage data used in a verifiable credential ecosystem. Separate versions of the API exist for issuers, holders, and verifiers of verifiable credentials.
- [OIDF OpenID Connect](#) (OIDC) is a suite of protocols on top of OAuth 2.0 that are API-friendly and enable decentralized identity.

- [DIF WACI-DIDComm Interop Profile](#) (WACI PEx) is a protocol for verifiable information exchange between verifiable credential holders and issuers or verifiers. WACI stands for Wallet and Credential Interactions.

- **DIGITAL IDENTITY**

A set of attributes about an entity used to provide access and interact with systems. Most identity relies on centralized authorities. Use newer decentralized identity when possible. All are VC compatible.

- **FEDERATED IDENTITY**

- › [IETF OAuth 2.0](#) gives clients delegated access to server resources on behalf of a resource owner by using access tokens.
- › [OIDF OpenID Connect 1.0 \(OIDC\)](#) allows identity verification by extending OAuth 2.0 in an API-friendly JSON/REST manner using JSON Web Tokens with robust signing and encryption and without requiring any passwords to be stored. Self-Issued OpenID Provider (SIOP) enables an end user to authenticate themselves.
- › [Security Assertion Markup Language \(SAML\)](#) is XML-based federated identity. OpenID Connect serves the same use cases in a simpler manner.
- › [User Managed Access \(UMA\)](#) extends OAuth with APIs.
- › [JSON Web Token \(JWT\)](#) A way to add signature and encryption to JSON data, signed either using a private secret or a public/private key.

- **DECENTRALIZED IDENTITY**

- › [W3C Decentralized Identifiers \(DID\)](#) fundamentally reimagine identity by putting trusted proof over identity in the hands of its controller without needing centralized registration authority, based on the Self-Sovereign Identity paradigm. DIDs are globally unique URIs for a type of document about a subject. They can be stored on distributed ledgers, distributed file systems, or any other kind of storage. There are over 100 DID methods for proving identity. DIDs are also compatible with federated identity systems. You can use the DIF Universal DID Resolver to view DID documents from over 50 DID methods.

- **REVOCAION** manages revoked credentials. This area is underdeveloped.

- [W3C Status List 2021](#) A mechanism for storing the status of credentials on the web so that they can be looked up to see if they are suspended, revoked, etc. See also the earlier [W3C Revocation List 2020](#).

- **PRESENTATION** is how credentials can be shared with recipients.

- [W3C Verifiable Presentation Request Specification](#) Intended to perform client requests for credential data from wallets or agents and to align with DID Comm and OIDC Credential Provider (in Development, JSON).



APPENDIX B: Who's Jason?

JSON (pronounced Jason or Jay-sawn) and his cousin, JSON-LD, are locals at the data standards bar, and you've got to know them. The following are all file formats used for storing and transporting (serializing) data. Many of our open data standards are expressed in one or more of these.

- **JSON** is a lightweight data-exchange and file format that is easily understood by computers and humans alike. He's about 22 years old.
- **JSON-LD**'s suffix means Linked Data (LD). Enables a network of standards-based, machine-readable data across the web. At 12 years old, he's the always-on-line Zoomer version of JSON. JSON-LD is RDF in JSON.
- **RDF** Glad you asked. RDF stands for Resource Description Framework which models "triples": a subject, an object, and their relationship. Each piece has a URL. It's fabulously versatile. "The sky is blue," "Tony is no longer friends with Rebecca," and "Candidate submitted application" are all triples. RDF is most commonly expressed in the Turtle format, which is compact, stackable, and human-friendly, like a turtle. As mentioned, RDF can also be serialized (expressed) in JSON-LD, among other formats. RDF is a type of graph database. RDF Schema (RDFS) powers up RDF to enable the representation of ontologies. And if that doesn't cut it for you, you need OWL.
- **OWL**, which stands for Web Ontology Language, are complex languages for taxonomies and classifications built on RDF.
- **XML** Extensible Markup Language is a language and file format similar to HTML that describes data with tags that you must define yourself. It's hierarchical, which is a key limitation compared to the anything-goes relationships between data possible with RDF. It came out around the same time as RDF.
- **SKOS**, the Simple Knowledge Organization System, is built on RDF/RDFS. SKOS underlies one of our competency framework standards, ESCO.
- **YAML** If you don't like looking at code, you're going to love YAML (pronounced YAH-ml). Since it came out after XML, RDF, and many others, it stands for Yet Another Markup Language. It can parse other formats into a human-friendlier layout and may be a better route than JSON for that reason.
- **EDI**-based standards, Electronic Data Interchange (EDI) is a format that has been around forever to transport business documents between organizations across industries and is complementary to the other file formats here.
- **CSV** Forget it, just give me a CSV! This file type is often what's used to transport data between systems since it's so widely accepted. However, using CSVs in this way is often tedious and error-prone. Data standards can be an alternative to using CSVs.

APPENDIX C: Open Standards Communities

To learn more or participate in the development of these standards, check out these international communities:

- **1EdTech** and **OpenBadges** 1EdTech (formerly IMS) has a free account with access to technical resources, forums, and public communications, with paid organization-only member tiers for product testing, interoperability certification, and participation in development across 1EdTech standards, including CASE, OpenBadges, and CLR.
- **Advanced Distributed Learning Initiative (ADL)** bridges across Defense and other federal agencies to encourage collaboration, facilitate interoperability, and promote best practices for using distributed learning to provide the highest-quality education, training, informal learning, and just-in-time support; tailored to individual needs and delivered cost-effectively, anytime and anywhere, to increase readiness, save resources, and facilitate inter-organizational collaboration.
- **Arizona State University Trusted Learner Network** offers institutions and credential issuers a space to explore complex challenges and develop new ways to record, curate, and share achievements and skills across the learner's lifespan.
- **Credential Engine** supports an open, collaborative, and iterative process as the Credential Transparency Description Language (CTDL) family of specifications (schemas and APIs) evolve over time. The Registry links important contextualization from and to competencies such as credentials, courses, assessments, jobs, transfer value, education and career pathways, and more. Credential Registry [publishing system](#) options including APIs, bulk upload, web ingest, and manual entry by setting up a free Credential Engine account.
- **Data Standards United (DSU)** aligns standards to support the global education and workforce digital ecosystem. It's a meta-community because members include other communities A4L, Dublin Core, HR Open, 1EdTech (formerly IMS Global), MedBiquitous, PESC, ADL, Credential Engine, IEEE LTSC and more. In their coming phase two of work, they will shine light on standards for employer use.
- **Decentralized Identity Foundation (DIF)** develops the foundational components of an open, stan-

- dards-based, decentralized identity ecosystem for people, organizations, apps, and devices.
- [Dublin Core Metadata Innovation](#) is a community of metadata professionals and practitioners that share an open and forward-looking ethos of innovative practice, bridging established metadata practices and graph-based solutions for integration across data silos within a Linked Data ecosystem.
 - [Groningen Declaration](#) An International nonprofit and voluntary network that supports academic and professional digital credential mobility. This is the records portability that empowers people.
 - [HR Open Standards Consortium](#) The only independent, non-profit, volunteer-led organization dedicated to the development and promotion of a standard suite of specifications to enable human resource related data exchanges.
 - [IBM Learner Credential Network](#) connects learners, employers, and education providers across industries and countries on a trusted, blockchain-based network.
 - [IEEE Learning Technology Standards Committee \(LTSC\)](#) welcomes new members who can volunteer their time and expertise to help understand and solve product interoperability issues caused by the rapid advance of new learning technologies.
 - [Internet Identity Workshop](#) meets to discover and solve identity issues, particularly user-centric identity. They move issues downfield in style.
 - [Learning Economy Foundation Steering](#) Join to help guide the direction of the Learning Economy offerings and communities, including technology pilots, wallet infrastructure, talent marketplaces, and more through an open steering committee.
 - [Linux Trust Over IP Foundation](#) A robust, common standard and complete architecture for Internet-scale digital trust.
 - [MIT Digital Credentials Consortium \(DCC\)](#) Founded in 2018 by leading universities with expertise in the design of verifiable digital credentials. Together, they are designing an infrastructure for digital credentials of academic achievement.
 - [Open Recognition Alliance](#) brings together international individual and collective actors who want to build an open and learning society, based on the recognition of the talents, skills, and aspirations of individuals, communities, and territories.
 - [Open Skills Network](#) A community of practice to drive widespread adoption of skills-based hiring and education practices.
 - [Postsecondary Electronic Standards Council \(PESC\)](#) Establishing trusted, free, and open data standards across education since 1997.
 - [T3 Innovation Network](#) This network is made up of over 1,500 professionals working to facilitate the digital transformation of the talent marketplace to (1) make all learning count; (2) enable competencies and skills to function like currency; and (3) empower learners and workers with data.

- **Web3 Education Alliance** a global coalition to proliferate equitable web3 technologies for education and employment through action research and pilots.
- **W3C Credentials Community Group (W3C-CCG)** explores the creation, storage, presentation, verification, and user control of credentials by drafting and incubating proposed Internet specifications for further standardization and prototyping and testing reference implementations.
- **W3C VC-Edu Task Force** Anchored by the Digital Credentials Consortium and W3C Credentials Community Group (CCG), the Verifiable Credentials for Education Task Force (VC-Edu) seeks to align global partners, implementers, and the public around Verifiable Credential use cases, requirements, modeling, usage guidelines, and best practices.
- **World Economic Forum Reskilling Revolution** invites companies with global reach, who are working on improving education, skills, and jobs within their companies, and local and global communities to join the Reskilling Revolution Business Alliance.



APPENDIX D: Learning and Employment Records

LEARNING AND EMPLOYMENT RECORDS

"A [Learning and Employment Record](#) (LER) is an open, standards-based, non-proprietary, digital learning and work record that can be linked to an individual and combined with other digital records to pursue educational and employment opportunities" (Central New Mexico College, 2022). It meets a set of principles and is compatible with the W3C Verifiable Credential (VC) standard. The community has rallied around the VC for its interoperability, security, privacy, support for proof, ability to be stored in a decentralized fashion, compliance with decentralized identity, and ability to allow use at a highly granular level within the credentials themselves. Credentials can also be revoked or expire without communication between you and the verifiers. This can be useful when either a credential was mistakenly assigned or if it's only valid for five years at a time. LERs include Comprehensive Learner Records (CLR), verifiable credentials from military, Open Badges, and more. These credentials should contain descriptions of the skills that the learner obtains, using the skill framework technology from pilot B: Use and Create Skills Frameworks.

DIGITAL WALLETS

Digital wallets hold any kind of education, training, employment, and achievement information about individuals. You can work with an existing wallet provider. Wallets which allow users to take their credentials with them to another wallet (portable wallets) are essential. For example, the iDatafy [SmartResume](#) connects employers and job seekers with a marketplace of resumes that have at least one verifiable credential earned from partner institutions to increase the trustworthiness of the search process. An excellent resource on VC-compliant wallets is the Jobs For the Future [Verifiable Credentials Wallets for Learning and Employment Market Scan](#) which highlights in-production as well as developing implementations.

DIGITAL IDENTITY

The future of identity on the web is each user controlling their own identity across platforms. Many wallets already support this kind of self-sovereign identity which gives global agency and security to users by supporting an authentication method called Decentralized Identity (DID). DIDs clear up problems with identity disambiguation when "Eric Le" and "Eric Le" could be the same or different people between platforms.



GLOSSARY

ANALYZE & PLAN

OPEN DATA STANDARD: “A data standard is a technical specification that describes how data should be stored or exchanged for the consistent collection and interoperability of that data across different systems, sources, and users” ((U.S. General Services Administration Technology Transformation Services, n.d.). Open data standards are ideally made available to the public, governed openly, interoperable, machine and human readable, and enable data consistency, portability, and usefulness.

SKILLS AND COMPETENCIES: The playbook uses the term “skills” to encompass skills and competencies, using the broad definition of “assertions of academic, professional, occupational, vocational and life goals, outcomes, and standards, however labeled” (Credential Engine, 2022). Work tasks, activities, responsibilities, knowledge, skills, and abilities can also be included in this term for simplicity.

UPSKILLING AND RESKILLING: Employers upskill their employees by providing them opportunities to learn more skills. Reskilling is the process of learning new skills so you can do a different job, or training people to do a different job.

COMMUNICATE OPPORTUNITIES

COMMUNITY PARTNERSHIPS: Working together with educational, technology, community-based,

wraparound, and government service providers will open up avenues for comprehensive, inclusive, and high-impact talent pipelines.

CROSS-FUNCTIONAL COLLABORATION: Cross-functional collaboration helps break down silos between people or departments who do different types of work for the same company and improve overall performance on company-wide goals.

SKILL AND COMPETENCY FRAMEWORKS: Any list, ontology, or taxonomy of logically-related skills or competencies shared by an education provider, employer, industry consortia, government agency, workforce agency, etc. can be described as a competency framework. “Logically-related” encompasses a set of items brought together for some purpose, such as to describe a role, course, or occupation. When openly licensed and stored in an open data standard, these frameworks can be widely referenced and reused, creating more consistent understandings across organizations.

ACQUIRE TALENT

DIGITAL CREDENTIAL: Credentials are not just degrees - a digital credential is a set of one or more claims made by an issuer (such as an education provider) (Sporny et al., 2022).

DIGITAL WALLET: A wallet secures and manages digital data stored in a location controlled by the wallet holder. Wallets “provide storage of keys, credentials, and secrets, often facilitated or controlled by an agent.” (Young & Johnson, 2020). An agent is a “software representative of a subject (most often a person) that controls access to a wallet and other storage, can live in different locations on a network (cloud vs. local), and can facilitate or perform messaging or interactions with other subjects”.

RECORD IN A WALLET: Anything stored in a wallet becomes a record, like a credential, a self-asserted achievement, a work sample, or an endorsement by a colleague.

SELECTIVE OR PROGRESSIVE DISCLOSURE: Records which enable selective disclosure or progressive disclosure allow an

individual to share elements of their records without sharing it in its entirety or all at once, respectively. One application of this tech is a hiring workflow that can intake applicants without their age, gender, race or ethnicity, address, name, the name of the school they attended, or any other identifying information deemed at risk for biasing the results. Individuals can later authorize sending identifying information as needed.

TRAIN, DEVELOP, AND DOCUMENT SKILLS

ACHIEVEMENT: "An accomplishment such as a degree, evidence of competency mastery, a course completion, or other accomplishment. An achievement may be asserted about one or more Learners [sic]" ("IMS Comprehensive Learner," 2022). An assertion about an achievement is specific to one learner and can be turned into a record that you store in a digital wallet.

ASSERTION: "The attestation made by an Issuer about a Learner regarding an Achievement [sic]" (LTSC). "Assertion properties are specific to one learner's achievement and [may] specify metadata such as issuer, date of achievement, expiration data, as well as results and evidence that support the assertion" (1EdTech Open Badges). An achievement is self-asserted when it is declared by the individual (as opposed to an institution declaring the individual has it).

DIGITAL BADGE: A digital badge is an online representation of a skill you've earned. Open Badges take that concept one step further, "are verifiable and shareable, and they contain detailed information about the achievement and what the recipient did to earn the badge" (1EdTech FAQ). These badges are compliant with the Open Badge Standard.

DIGITAL IDENTITY: A digital identity is information about an entity used by computer systems to represent an external agent. That agent may be a person, organization, application, or device. Digital identity can be centralized (one identity per application) or decentralized, as with federated (one identity can be used across applications) or self-sovereign identity (identity controlled by the agent).

ISSUING: Issuers issue (confer) assertions about people (learners). Issuers are commonly education providers and employers who provide training or want to sign off on skills learned on the job.

PRESENTATION FROM A WALLET: All or a subset of information stored in a wallet can be bundled and shared with a recipient. A verifiable presentation is tamper-evident. It contains data derived from one or more verifiable credentials, issued by one or more issuers, that is shared with a specific verifier when encoded in such a way that authorship of the data can be trusted after a process of cryptographic verification. Certain types of verifiable presentations might contain data that is synthesized from, but do not contain, the original verifiable credentials (for example, zero-knowledge proofs) (Sporny, et al). An example is confirming whether the subject is over 18, without disclosing the subject's age. These protect the subject's privacy.

PROOF: An education provider can add digital proof to an assertion which is more powerful than a physical signature. A proof is a mathematical algorithm routinely used to validate the authenticity and integrity of a message (e.g. an email, a credit card transaction, or a digital document). These are often called digital signatures, because they “create a virtual fingerprint that is unique to a person or entity and are used to identify users and protect information in digital messages or documents. In emails, the email content itself becomes part of the digital signature. Digital signatures are significantly more secure than other forms of electronic signatures. There are many types of digital signatures but their value is in proving that a digital message or document was not modified—intentionally or unintentionally—from the time it was signed” (CISA).

SELF-SOVEREIGN IDENTITY: A decentralized approach to digital identity. Self-sovereign identity (SSI) allows an individual to manage their digital identity(ies) without the intervention of an organization or government agency. When an individual wants to prove their identity(ies), they can work directly with the verifier without engaging the identity issuer. The method uses distributed ledger and wallet technology and provides significant access, control, consent, privacy, security, portability, transparency, recoverability, and other benefits (López).

STORAGE: Storing assertions about achievements in digital wallets can enable access on the cloud and on local storage like a mobile device. Information facilitating verification and authentication can be stored on distributed ledgers such as blockchain. These storage methods do what centralized databases cannot when it comes to security, access, privacy, and more.

VERIFIABLE CREDENTIAL: "A tamper-evident credential that has authorship that can be cryptographically verified. Verifiable credentials can be used to build verifiable presentations, which can also be cryptographically verified. The claims in a credential can be about different subjects" (Sporny, et al).

VERIFICATION: Evaluation of whether a digital credential is an authentic and timely statement from the issuer or presenter. Compare with Validation which is making sure that the information in a digital credential is valid for the business case (Sporny, et al).



ACKNOWLEDGMENTS



This playbook is made possible through the generous support of Walmart.

We'd like to thank our reviewers and contributors, who are all standout members of the open standards community: Phil Long, Jim Goodell, Deb Everhart, Alex Jackl, Simone Ravaioli, Taylor Kendal, Colin Reynolds, Mark Leuba, Andrew Cunsolo, Jeanne Kitchens, and Kathleen Webb.

The community members who informed our open data standards principles include Jeanne Kitchens, Darrell O'Donnell, Jim Goodell, Phil Long, Dmitri Zagidulin, Drummond Reed, and Simone Ravaioli. The open standards principles were influenced by the following organizations' data standards principles: Open Data Institute, Open Data Standards Directory, OpenStand, gov.uk Open Standards Principles, resources.data.gov, CEDS, Open Data Charter, W3C Data on the Web Best Practices, Sovrin Principles of SSI, HR Open, the United Nations ITU-T, and Data Standards United.

The authors Danielle Saunders and Duncan Cox are grateful for the energy of these contributors and editor Gabriel Sage.

About Philanthropy at Walmart

Walmart.org represents Walmart's philanthropic efforts. By focusing where the business has unique strengths, Walmart.org works to tackle key social and environmental issues and collaborate with others to spark long-lasting systemic change. Walmart has stores in 24 countries, employs more than 2.2 million associates and does business with thousands of suppliers who, in turn, employ millions of people. Walmart.org is helping people live better by supporting programs to accelerate upward job mobility for frontline workers, advance equity, address hunger, build inclusive economic opportunity for people in supply chains, protect and restore nature, reduce waste and emissions, and build strong communities where Walmart operates. To learn more, visit walmart.org or connect on Twitter @Walmartorg.

DISCLAIMER The research included in this report was made possible through funding by Walmart. The findings, conclusions and recommendations presented in this report are those of the Learning Economy Foundation alone, and do not necessarily reflect the opinions of Walmart.

Please reuse with attribution (CC BY 4.0).



REFERENCES

1EdTech (formerly IMS Global). (n.d.). Frequently Asked Questions & Glossary. Open Badges. Retrieved February 2, 2022, from <https://openbadges.org/about/faq>

1EdTech (formerly IMS Global). (n.d.). Open Badges and Comprehensive Learner Record Standard Frequently Asked Questions for All Audiences. IMS Global. Retrieved June 22, 2022 from <http://www.imsglobal.org/clar/faq>

1EdTech (formerly IMS Global). (n.d.). IMS Comprehensive Learner Record Standard Version 1.0. IMS Global. Retrieved February 2, 2022, from <https://www.imsglobal.org/spec/clar/v1p0>

1EdTech (formerly IMS Global). (2021, July 6). Open Badges 3.0. IMS Global. Retrieved February 2, 2022, from <https://raw.githubusercontent.com/concentricsky/openbadges-specification/feature/ob3/proposals/OBV3p0/Proposal-Open-Badges-3.0.pdf>

American Staffing Association. (2021, January 16). Lack of Experience Biggest Barrier for Unemployed Job Seekers. <https://americanstaffing.net/posts/2016/01/21/lack-of-experience-biggest-barrier-for-unemployed-job-seekers/>

Bughin, J., Hazan, E., Lund, S., Dahlström, P., Wiesinger, A., & Subramaniam, A. (2018, May 23). Skill shift: Automation and the future of the workforce. McKinsey & Company. <https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce>

Cacicio, S., Tinsley, B., Miller, A., & Luna, C.L. (2022, April). Inclusive Design Principles for Learning and Employment Records: Co-Designing for Equity. Digital Promise. <https://digitalpromise.dspacedirect.org/bitstream/handle/20.500.12265/154/Inclusive%20Design%20Principles%20for%20Learning%20and%20Employment%20Records%20Apr2022.pdf?sequence=1&isAllowed=y>

Cappelli, Peter. (2019, May 1). Your Approach to Hiring Is All Wrong. Harvard Business Review. <https://hbr.org/2019/05/your-approach-to-hiring-is-all-wrong?ab=seriesnav-spotlight>

Central New Mexico College. (2022). A National Learning and Employment Records Infrastructure: Progress towards a Skills Economy. [Unpublished manuscript].

Credential Engine. (2022, June 24). Credential Transparency Description Language. CE Technical. Retrieved June 2022, from <https://credreg.net/ctdl/terms/Competency#Competency>

Cybersecurity and Infrastructure Security Society. (2020, August 24). Security Tip (ST04-018) Understanding Digital Signatures. Retrieved February 2, 2022, from <https://www.cisa.gov/uscert/ncas/tips/ST04-018>

Fuller, J.B., Raman, M., Sage-Gavin, E., & Hines, K. (2021, October 4). Hidden Workers: Untapped Talent. Harvard Business School. <https://www.hbs.edu/managing-the-future-of-work/Documents/research/hiddenworkers09032021.pdf>

Goger, A., Parco, A., & Vegas, E. (2022, May). Learning and working in the digital age: Advancing opportunities and identifying the risks. Brookings. https://www.brookings.edu/wp-content/uploads/2022/05/Learning-and-working-in-the-digital-age_FINAL.pdf

HireRight. (2020, August 26). HireRight Global Benchmark Report. <https://www.hireright.com/resource-library/view/2020-global-benchmark-report>

IEEE Learning Technology Standards Committee. (2022). Integrated Learner Record (ILR)Ecosystems Standard Recommended Practices IEEE P1484.2 IEEE. Retrieved February 2, 2022, from <https://docs.google.com/document/d/1eojegX-3qjP8zqNX2weCYuURtm5aJyJbGOnquoqsRyE/edit#>

LaPrade, A., Mertens, J., Moore, T., & Wright, A. (2019, September).The Enterprise Guide to Closing the Skills Gap. IBM Institute for Business Value. <https://www.ibm.com/downloads/cas/EPYMNBJA>

LinkedIn Learning. (2019). 2019 Workplace Learning Report. <https://learning.linkedin.com/content/dam/me/business/en-us/amp/learning-solutions/images/workplace-learning-report-2019/pdf/workplace-learning-report-2019.pdf>

Lohr, Steve. (2022, April 8). A Four-Year College Degree Requirements in Hiring Are Slowly Easing. *New York Times*. <https://www.nytimes.com/2022/04/08/business/hiring-without-college-degree.html>

López, Marcos Allende. (2020). Self-Sovereign Identity: The Future of Identity: Self-Sovereignty, Digital Wallets, and Blockchain. Inter-American Development Bank. Retrieved February 2, 2022, from <https://publications.iadb.org/publications/english/document/Self-Sovereign-Identity-The-Future-of-Identity-Self-Sovereignty-Digital-Wallets-and-Blockchain.pdf>

Mohr, Tara Sophia. (2014, August 25). *Why Women Don't Apply for Jobs Unless They're 100% Qualified*. Harvard Business Review. <https://hbr.org/2014/08/why-women-dont-apply-for-jobs-unless-theyre-100-qualified>

Opportunity@Work. (2021). Reach for the STARS: Realizing the Potential of America's Hidden Talent Pool. <https://opportunityatwork.org/our-solutions/stars-insights/reach-stars-report/>

Society for Human Resource Management. (n.d.). Managing for Employee Retention. SHRM Foundation. Retrieved June 15, 2022, from <https://www.shrm.org/resourcesandtools/tools-and-samples/toolkits/pages/managingforemployeeretention.aspx>

Society for Human Resource Management. (n.d.). The Rise of Alternative Credentials in Hiring. SHRM Foundation. <https://shrm.org/foundation/about/Documents/The%20Rise%20Of%20Alternative%20Credentials%20In%20Hiring.pdf>

Sigelman, M., Taska, B., O'Kane, L., Nitschke, J., Strack, R., Baier, J., Breitling, F., & Kotsis, A. (2022, May 23). *Shifting Skills, Moving Targets, and Remaking the Workforce*. Boston Consulting Group. <https://www.bcg.com/publications/2022/shifting-skills-moving-targets-remaking-workforce>

Sporny, M., Longely, D., & Chadwick, D. (2022, March 3). Verifiable Credentials Data Model v1.1. W3C. Retrieved February 2, 2022, from <https://www.w3.org/TR/vc-data-model/>

The Burning Glass Institute. (2022, February 9). The Emerging Degree Reset. <https://www.burningglassinstitute.org/research/the-emerging-degree-reset>

Thomas, D. & Brown, J.S. (2011). A New Culture of Learning: Cultivating the Imagination for a World of Constant Change. CreateSpace Independent Publishing Platform.

Upwork. (2021, December 8). Upwork Study Finds 59 Million Americans Freelancing Amid Turbulent Labor Market. <https://investors.upwork.com/news-releases/news-release-details/upwork-study-finds-59-million-americans-freelancing-amid>

U.S. General Services Administration Technology Transformation Services, Office of Government and Information Services, & Office of Management and Budget. (n.d.). Federal Enterprise Data Resources. Retrieved February 2, 2022, from <https://resources.data.gov/standards/concepts/>

World Economic Forum. (2020, October). The Future of Jobs Report 2020. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

Young, K., & Johnson, M. (2020, July 16). Finding the Bell Curve of Meaning. Medium. Retrieved February 2, 2022, from <https://medium.com/decentralized-identity/finding-the-bell-curve-of-meaning-61a1d22b7bdd>

Connect and learn more!



info@learningeconomy.io



learningeconomy.io/openstandards