

Learning and Employment Records: A complex technology amidst a shifting educational and  
employment environment

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LDES 5002: Technology Innovation by Design

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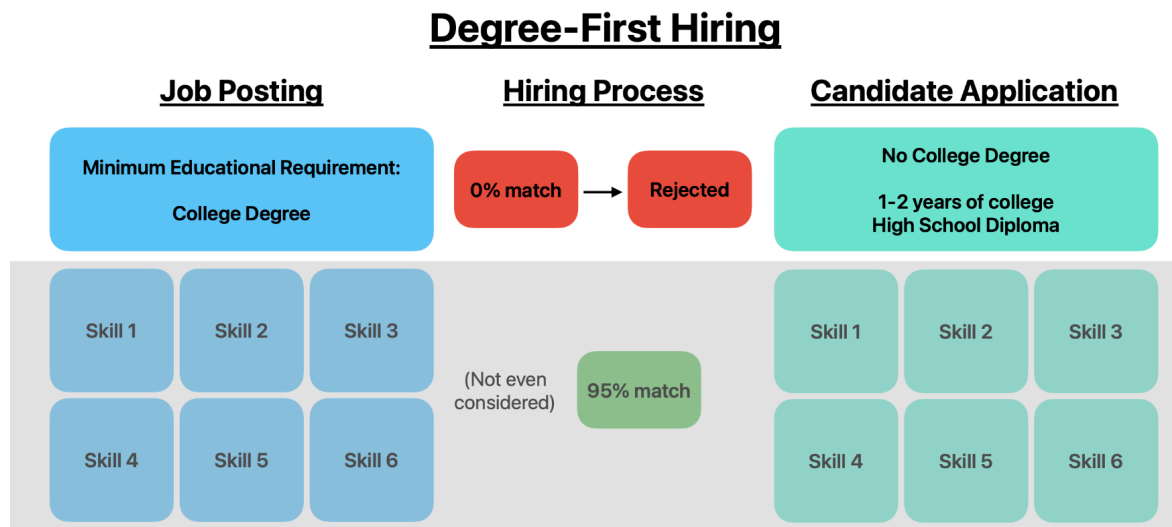
## Visualizations

[A visualization of a Skills-Based Hiring Platform powered by LERs](#) (made by Claude AI).<sup>1</sup>

## Introduction

According to [Harvard Business School](#) (HBS), the American economy is suffering from degree inflation.<sup>2</sup> That is, jobs that did not require a bachelors degree have come to require them. This creates an inefficiency in the hiring process and an obstacle for job seekers. According to Burning Glass, companies started to increase their degree requirements to job postings, despite the fact that these jobs were getting harder to fill and the skills to do these jobs had not changed. For example, HBS cites that 16% of current production workers have degrees, but now 67% of production worker job postings require a college degree as a minimum educational requirement. Furthermore, HBS's survey of employers showcased that these job postings showed 9 out of 10 of the same skills now as they did before the new degree requirement.

*Figure 1: Degree-First Hiring that overlooks skilled, non-degree holding applicants.*



One logical question follows, why are these companies increasing their educational requirements if the required skills remain largely the same? This is what the researchers call

<sup>1</sup> Claude, Opus 4.5. <https://claude.ai/public/artifacts/4ce41786-a17b-4ed3-867f-5db3215547c7>

<sup>2</sup> Fuller, J.B., Raman, M., et al. (2017) [Dismissed by Degrees](#). Published by Accenture, Grads of Life, Harvard Business School.

degree inflation. The researchers tried to tease out the reasons behind this economy-wide trend using a survey of employers. In the results, employers generally conveyed a sense that middle-skill jobs in recent decades have become more complex, requiring more hard and soft skills. However, at the same time, the researchers found that the skills in job descriptions rarely changed at all. How to square that contradiction? General trends in the workforce and the complexity were perceived as increasing, and even though the skills remained the same, employers wanted candidates to demonstrate a higher ability in certain skills, such as with certain technologies or in verbal communication. Degrees became an easy shorthand for employers to convey their general desire for higher quality candidates, and they were willing to pay a premium for graduates to fill these roles. Employers routinely implement degree requirements even though doing so shrinks the quantity of available candidates—many of whom could complete the job. In fact, many non-degree holders continue to demonstrate their ability to complete the jobs that were formerly open to those without degrees.

In response to this degree inflation, many organizations and coalitions have sprouted up to reduce the “degree gap” and open up more jobs back to middle-skill workers who do not have a degree, but have a demonstrated capacity to complete the job and match the skills required. Tear the Paper Ceiling is one major example, and the organization builds the case for new practices to better match hirers and job seekers. They highlight the millions of Americans who are “Skilled Through Alternative Routes” or STARs that are struggling to find work due to degree inflation.<sup>3</sup>

A suite of movements have started over the past couple of decades to address this problem. Each of them have centered around the idea of “Skills-Based Hiring” or SBH, which would encourage employers to start their search with specific skill requirements and evaluating candidates directly according to their abilities in those skills, rather than defaulting to the college degree as a proxy for a massive set of hard and soft skills.

According to [Tear the Paper Ceiling](#), SBH produces a number of advantages for both employers and job seekers. The first is that it better connects jobs with qualified candidates. Eliminating degree requirements widens the opportunities available to non-degree holders and widens the amount of candidates available for employers. They cite research from LinkedIn showing that starting with skills makes employers 60% more likely to fill the job.<sup>4</sup>

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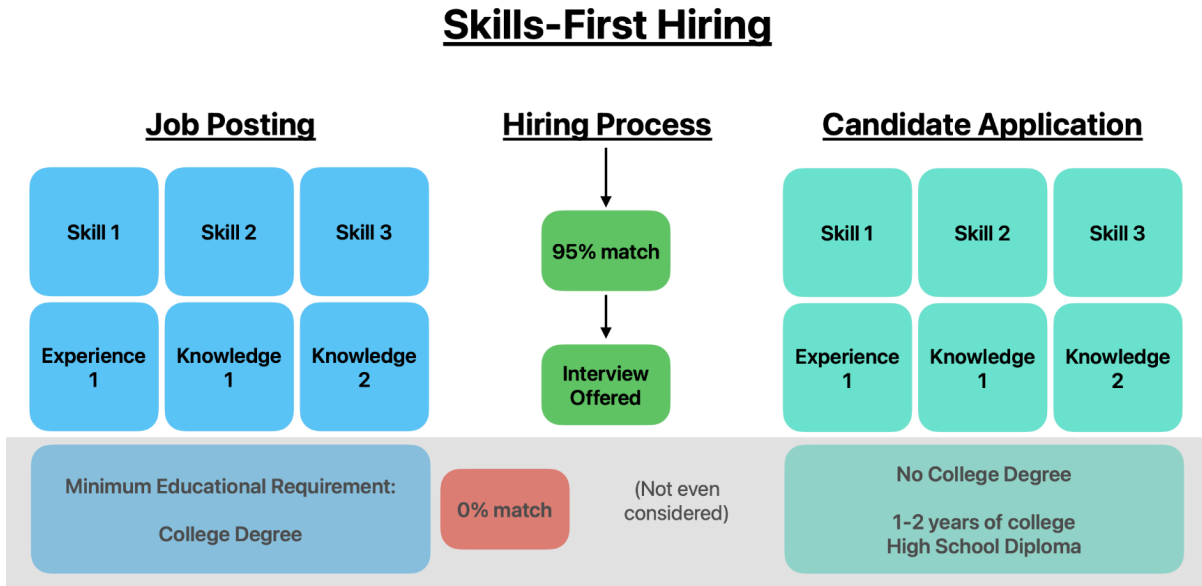
<sup>3</sup> Tear the Paper Ceiling. (2025) [About STARs](#). Online.

<sup>4</sup> LinkedIn, (2022). [A Skills-First Blueprint for Better Job Outcomes](#). Online.

For employers, SBH can reduce costs per hire by 30%, according to the Society for Human Resource Management.<sup>5</sup> This entails reducing the timing for finding candidates, as well as a lower starting salary for those without degrees. It also improves retention, according to a McKinsey report showing that non-degree holders stay at a job 34% longer.<sup>6</sup>

For job seekers, the benefits of finding quality-paying jobs quicker are obvious. More job opportunities can enable STARS to find work without spending immense time and money on going back to school and getting a bachelor’s degree. Instead, they can acquire skills from learning providers or apply skills that they acquired from past experiences.

Figure 2: Skills-First Hiring that hires those with the right skills, regardless of their educational level.



But to talk about skills-first hiring, we need to first talk about skilling. This is a trend in the past few decades to create short skill pathways, certificates, or microcredentials that showcase your proficiency in a very particular skill. Foreign languages have long had the infrastructure set up for acquiring a proficiency credential, which you may acquire by taking a test to demonstrate your proficiency in a language. Many skills could have dedicated programs, such as coding in particular languages, verbal communication, data analytics, workshop facilitation.

<sup>5</sup> Maurer, R. (2025). [Skills-First Hiring Advances as Workers Reclaim Career Mobility](#). SHRM.

<sup>6</sup> McKinsey. (2022). [Taking a skills-based approach to building the future workforce | McKinsey](#)

Some industries have created upskilling pathways that build on the foundations of a discipline, in a practice called skills stacking.<sup>7</sup> For example, teachers can be certified in a special style or pedagogy or in a particular subject area. Construction workers might climb ladders of certifications to gain higher posts in the job site, from fork lift operating to using advanced machinery to using analytical tools and modeling software.

The landscape of skills programs is vast and diverse. Credential Engine's [Counting Credentials 2025 Report](#) states that there are 1.85 million credential programs available in the United States, across 134 thousand providers, amounting to 2.34 trillion dollars in total expenditures.<sup>8</sup> 1 million of these are badges and 486 thousand are certificates, compared to 264 thousand college degrees and 53 thousand secondary school diplomas. Quantity-wise, badges and certificates outnumber degrees and diplomas by almost 5 to 1.

According to the World Economic Forum's [Future of Jobs Report 2025](#), about 39% of workers' existing skillsets will be transformed or outdated over the 2025-2030 period.<sup>9</sup> This has been reduced from the estimated 44% in 2023 and 57% in 2020, and the authors suspect that this is because a higher percentage of workers have completed skilling and retraining programs (up to 50% in 2025 compared to 41% in 2023). Considering these two reports together, it appears that employers recognize a need to skill and retrain their current workforce in real time, and skills and credentialing programs are arising to fill that need.

### **LER Solution and Characteristics**

Although skills pathways can be useful for employees to advance and remain relevant within their current companies, skill badges and credentials present challenges to current hiring practices.

The first major problem is verification. How can an employer know whether or not a candidate's claimed skills are indeed verified skills? An interview could be enough to test someone's knowledge, or administering some sort of test or performance interview, but this would be very costly to implement for every candidate. Employers trust to some extent that accredited colleges will place graduates through some levels of testing and accountability before allowing them to

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<sup>7</sup> Pearson. (2025). [Lost in Transition: Fixing the "learn-to-earn" skills gap](#).

<sup>8</sup> Credential Engine. (2025) [Counting Credentials 2025 Report](#).

<sup>9</sup> World Economic Forum. (2025). [The Future of Jobs Report 2025](#).

graduate, even if it is not directly mapped onto skills. How can other learning providers, like skilling programs, provide the same level of trust among employers? How can employers then trust that those skills are true?

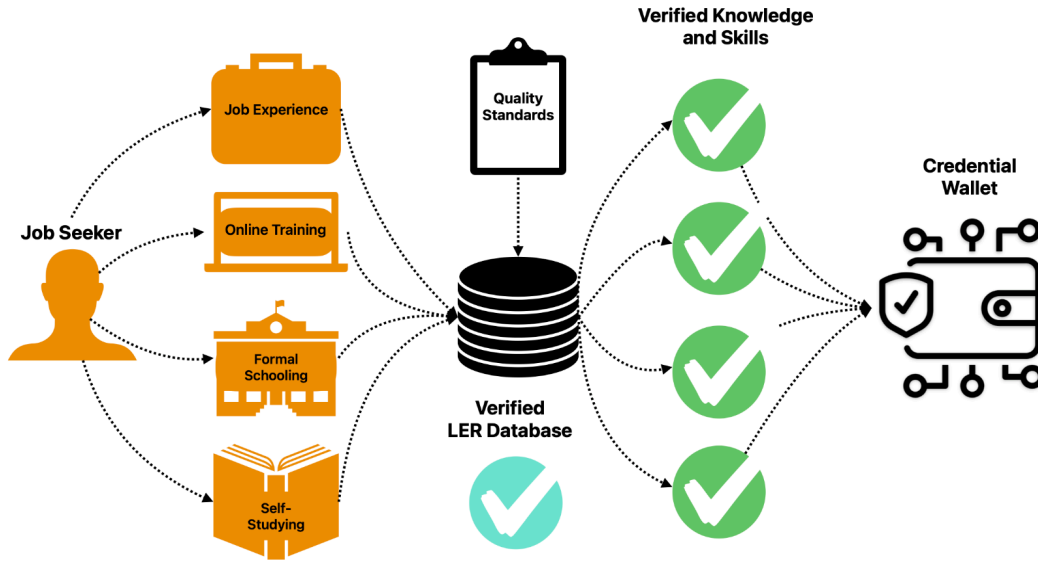
But what if the individual learned a skill on their own time, or at a past job, and they can't necessarily point to a program that they completed or a certificate they required? As it stands, there is no way of verifying those skills apart from reading a few bullets on a resume and trying to see if those are generally true during an interview.

A second major issue is standardization, which comes along with comparability. Even if a candidate has completed a certificate program or claims a skill in some other way, how can I compare their level of proficiency compared to another candidate who claims the same skill? Again, an interview could show that with some sort of on-the-spot task or evaluation, but this is costly at scale. It comes back to comparing bullet points on a resume.

To address these issues and enhance the efficiency of recruitment and career pathways, employers and technology developers have been investing in Learning and Employment Records (LERs). LERs refers to the technological environment needed to provide every job seeker and student with a verified record of skills and experiences that employers can look at, trust, and use to compare someone against other candidates. Creating this ecosystem for LERs requires a mix of technological innovation and cultural adoption, which, if successful, could alleviate the degree gap and open more opportunities for STARs. Building the LER ecosystem will require the coordinated collaboration of employers, learning providers, credentialing agencies, and technology developers.

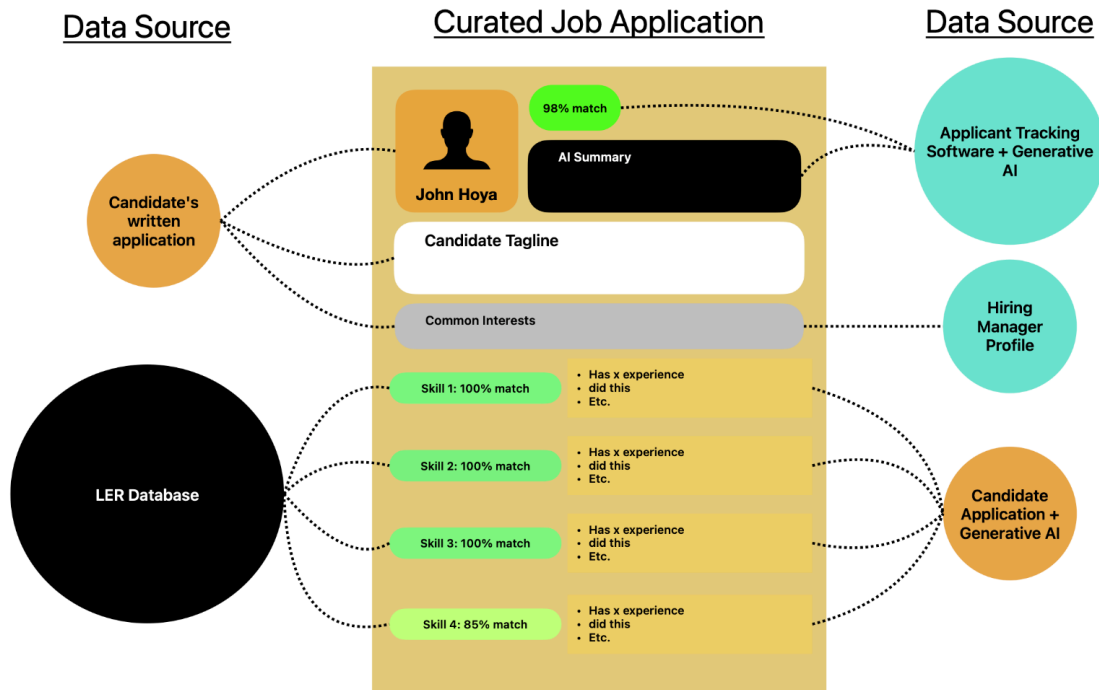
Below in Figure 3 is a rough sketch of how LERs would function for job seekers. The term "credential wallet" refers to the collection of verified credentials that a job seeker would be able to show to employers. In essence, this would complement or even replace the current standard credential of degrees and transcripts.

Figure 3: Diagram of a job seeker's credential wallet, mediated by the LER database.



In an LER-enabled hiring environment, candidates would submit their verified credential wallets when they apply to jobs. Employers would be able to see a candidate's verified skills and immediately evaluate how well they match to the job. This replaces educational level with relevant skills as the primary consideration in sorting through applicants.

Figure 4: Sketch of job application that draws on LER data, from the perspective of a hiring manager.



With LER-enabled technologies and hiring platforms, job seekers and employers will be able to be matched with greater efficiency and accuracy. The exact skills needed will map neatly onto those possessed by candidates, and employers will be able to trust and compare these skills across candidates.

### **LER Technology: Digital Wallets, Data Infrastructure & Blockchain**

The LER ideal is provocative, boasting clear advantages for businesses and job seekers. However, there are real challenges, both technological and cultural, that inhibit the widespread adoption of LERs. The [Education Design Lab](#) summarizes the key challenges and definitions in the LER ecosystem: digital discoverability, skills visibility, LER Digital Wallets, verification, and record portability.<sup>10</sup> Each term is a key feature of an LER ecosystem that technology developers, learning providers, and governments are attempting to address.

#### I. Digital Discoverability + Skills Visibility → Credential Transparency Description Language

*Digital discoverability* is the ability of job seekers and hirers to match with each other online using recruitment software and job posting websites. In an efficient, skill-based hiring ecosystem, jobs and job seekers would be easy to connect digitally. Employers and job seekers must be conscious of their *skills visibility*. Candidates must be able to curate and showcase their skills to employers, who would be expected to state explicitly what skills and knowledge are needed for the job. Combined with digital discoverability, visible skills would create a more streamlined matching process of relevant jobs for qualified candidates.

In order to create a digital environment where jobs and job seekers can match easily and effectively, job platforms must be open and accessible. Already, many employers post their job listings on platforms like Workday, as well as listings made on sources like HigherEdJobs, LinkedIn, Indeed, and many other platforms. These jobs listings are easily searchable by keyword, and they often specify minimum educational requirements, minimum years of experience, required skills, and specific job expectations.

However, often times these job postings do not allow for candidates to filter by skills or specific qualifications. Minimum educational requirements and minimum years of experience remain

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<sup>10</sup> Education Design Lab. (2025). [Learning and Employment Records \(LERs\)](#).

the norm, and although skills are visible on these platforms, they are often not in the most privileged position for either employers or job seekers.

To enable matching according to skills, learning providers and employers must come to common terms around how they define and measure skills in their data environments. If a job seeker has a verified credential and experience in delivering presentations and public speaking, but the job listing expresses a desire for “strong verbal communication skills,” how can the platform know if this candidate is the right match for the job? To address this problem, Credential Engine has developed the [Credential Transparency Description Language \(CTDL\)](#), which is a schema for storing and classifying data on credentials/skills that employers and learning providers can adopt to ensure that data can be shared and mutually understood across different platforms.<sup>11</sup> The language uses semantics in order to group and link skills, credential, and experiences that might use different language but express similar capacities.

## II. Verification → Blockchain

Verification refers to the ability of the employer to know if the expressed credential of a candidate is indeed an “authentic and timely” designation from the learning provider (education design lab).

Employers could verify if a credential is authentic by asking the learning provider who could use blockchain technology to award their credentials to learners. These blockchain-based credentials would be tamper-proof and hard or impossible to falsify.

To verify a credential, an employer could then request an individual verification from the learning provider, but this is often a costly and time consuming process and not easily scalable for a high volume of applicants.

## III. Interoperability and Record Portability → Open Data Ecosystem + LER Digital Wallet

*Interoperability* is an important capability for LERs when considering that credential data is being shared between learning providers, students/job seekers, employers, and even governments. The CDTL schema mentioned above is a critical first step in standardizing data collection and storage practices amongst these various stakeholders. The next important step, building on that common data schema is to create a more *open data ecosystem* that can enable

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<sup>11</sup> Credential Engine. (2025). [Credential Transparency Description Language \(CTDL\)](#).

quick and easy communication across multiple platforms. This can make it easier for job seekers to share their credentials with multiple employers and also make it easier for employers to verify if a person's credentials are authentic. One particularly powerful initiative in building an open data ecosystem would be the adoption of *Universal Learner Identifiers* or *ULIs*. With this innovation, data specific to individual learners/job seekers can be easily referenced across various stakeholders.

With the culmination of these various innovations, job seekers would be able to receive and share a *Credential Wallet* or *LER Digital Wallet*. This credential wallet would be under the ownership and control of the learner, whose wallets would be stocked with credentials from verified LER Awarders. The learner could then choose the credentials from their wallet that they wish to showcase to employers, who would receive a verified set of credentials for that specific applicant.

### Case Study: ASU Pocket Wallet

One early developer of LERs is the very innovative Arizona State University. They are piloting [Pocket](#), which is a credential wallet that stores all of the accomplishments and learnings that a student has completed while at ASU or elsewhere.<sup>12</sup>

A critical innovation that ASU has championed is the Trusted Learner Network (TLN), which heightens the privacy and security of student data and enables a high degree of credential portability.<sup>13</sup> TLN essentially replaces the normal sign-in process that requires email verification to verify identity. Instead, TLN uses a student's unique learner identifier ASUrite to match them directly with their file in the ASU credential registry, then generates a unique QR code which students can then scan. This enables the student to upload their credentials directly onto their personal devices. This enhances security and makes their credentials highly portable by living on their mobile device after being verified from the central database.

As a pilot project that was launched only last year, it is not yet apparent the impact that these LERs are having on students' job searches, nor is it clear how employers are responding to these new forms of credentials. However, it must be noted that since the LER is from an accredited university, and also contains official course records similar to a transcript, it is probable that

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<sup>12</sup> ASU. (2025). [ASU Pocket: A digital wallet to capture learners' real-time achievements](#)

<sup>13</sup> ASU. (2025). [How ASU's Trusted Learner Network and ASU Pocket put privacy first](#)

employers will view Pocket as a new format of an ASU degree and transcript, albeit one that the student has more sovereignty over.

## Adoption and *Diffusion of Innovation* Analysis

### The Progress of Adoption

When considering the extent of LER adoption, it is important to distinguish between three different phenomena. The first is the elimination of degree requirements. This is often the most visible and publicized announcement in job-related news, as seen by the 12 states that have eliminated degree requirements from all government jobs. However, as this [Brookings Institution article](#) states, this is the easiest step, and when taken alone is unlikely to change the status quo in hiring practices.<sup>14</sup> Employers are often set in their ways of using degrees as easy ways of sifting through applicants, and the perceived quality of different schools is another standard practice in how they compare competing applicants. A [2024 study](#) by Harvard Business School and the Burning Glass Institute found that the elimination of degree requirements only occurred for about 3.6% of jobs, and for those jobs postings, leading to only a 3.5% increase in eventual hires without a BA.<sup>15</sup> Taken together, this means that in 2023, only 1 out of every 700 hires benefited from access to new opportunities.

A second phenomenon to observe is the prevalence of skills-based hiring. This practice has taken root in some industries without the use of LERs, as can be seen in the tech industry, where coding skills are valued and demonstrated with timed and graded performance on given tasks.

However, this is different from the third phenomenon, which is the adoption of LERs. This specific use of LERs to verify and compare stated skills is best understood as a replacement for degree requirements as a more meaningful indication of how well a candidate would meet the expectations of a job.

According to the Brookings Institution article, LERs are a critical component to adopting skills-based hiring practices, but they alone are not the only change that must be made. Employer behavior must be altered, and there must be a sense of quality that is communicated

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<sup>14</sup> Goger, A. (2025). [There's more to skills-based hiring than just removing degree requirements](#). Brookings.

<sup>15</sup> Sigelman, M., Fuller, J., Martin, A. (2024) [Skills-Based Hiring: The Long Road from Pronouncements to Practice](#). Harvard Business School and The Burning Glass Institute.

by these credentials in order for them to have real weight in the hiring marketplace. Conversely, only when employers recognize them will learners and learning providers have a greater incentive to adopt them *en masse*.

Nevertheless, the work to create LERs and promote their adoption nationwide are well underway. Currently, 12 States have removed degree requirements and joined the organization called [Skills-Driven States](#), which shares best practices on building data infrastructure for skills and credentials.<sup>16</sup> This is an important figure, and governments can play a key role in building infrastructure that would legitimize LERs and make them functional. As large employers themselves, this move is a useful pilot program which they can learn from and popularize to other large employers.

Given the complex and interconnected data demands that are prerequisites to building LERs, complex multi-stakeholder organizations are needed to coordinate the creation of the necessary data infrastructure. In addition to Skills-Driven States, other organizations have formed and mobilized such as Credential Engine, Jobs for the Future, the LER Accelerator, and the T3 Innovation Network. These organizations share best practices, define data standards such as the CDTL, launch pilot programs, and help facilitate collaboration between learning providers, employers, and governments.

### **Rogers, *The Diffusion of Innovations Analysis***

Even with the creation of these complex, multi-stakeholder partnerships and networks, LER adoption is far from guaranteed. As with any new innovation, the rate of adoption can vary greatly, and is dependent on numerous factors, as espoused in Rogers' book *The Diffusion of Innovations*.<sup>17</sup> Factors include how much of a *relative advantage* the innovation offers, how *compatible* it is with current behaviors and cultural patterns, the structure of *information flows* and *social networks* determining how the innovation spreads throughout the system, as well as the structure of the *innovation-decision*.

One important aspect to note about LERs is that they are actually a *technology cluster*, rather than a lone technology. LERs consist of a set of closely interrelated technologies and innovations such as microcredentialing programs, blockchain verified credentials, an open data infrastructure, and advanced digital platforms for job posting and seeking. The *complexity* of this

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<sup>16</sup> National Governors Association. (2022). [Skills-Driven State Community of Practice](#).

<sup>17</sup> Rogers, M.E. (2003) *Diffusion of Innovations*. 5th Edition, Free Press, New York.

technology cluster presents a challenge in its adoption, as it is not only difficult to explain to stakeholders, but also difficult to design and implement.

Nevertheless, LERs provide a clear *relative advantage* over traditional degree credentials. They open access to new jobs for non-degreed workers, leading to higher relative wages, while also lowering costs for employers and increasing retention.<sup>18</sup>

To some extent, LERs are *compatible* with existing practices, as they could replace degrees, but only if they are able to replicate the sense of comparability that degrees and school brand names offer now, even if these degrees are only a proxy for skills and often involve subjective value judgments of a school's quality. Unlocking comparability is a key roadblock to LER adoption and can only come with better quality assurance standards and verification. However, there is a possibility that creating more transparent skills-first hiring practices would be incompatible with current hiring practices *precisely because* of their increased accuracy. It is possible that employers value the ability to make subjective, gut decisions on candidate quality based on factors like what school they went to. It is also possible that employers and hiring managers, many of whom hold degrees, like the idea of hiring people with degrees due to their perceived commonalities. While this is conjecture, there are definitely cultural nuances that will continue to shape hiring practices which may be difficult to observe. It is hard to imagine a survey in which employers admit to being biased to favor those who are similar to them, and the empirical data on LER adoption and its impact on hiring has not been thoroughly conducted yet, given how recent this innovation is.

To adopt LERs, a single job seeker cannot simply opt in and create one for themselves. LERs require multiple stakeholders, including technology developers, learning providers, and employers to agree to adopt the technology in order for it to have any value for the job seeker/learner. After all, if an applicant submits an LER but it is not compatible with the company's Applicant Tracking System (ATS), then they will have essentially submitted it into a void, not to be understood by the hiring manager. Due to this fact, LER adoption is subject to a *collective* and *authoritative innovation-decision*. Powerful entities must make the decision to adopt on behalf of job seekers/learners, and these entities must do so in tandem with one another. This type of innovation-decision is difficult and requires a high level of coordination, which the collection of partnership organizations like the T3 Innovation Network are trying to address.

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<sup>18</sup> Sigelman, M., Fuller, J., Martin, A. (2024) [Skills-Based Hiring: The Long Road from Pronouncements to Practice](#). Harvard Business School and The Burning Glass Institute.

Lastly, the social network that is concerned in the adoption of LERs is complex, hierarchical, and relatively *homophilic*. This means that *information* travels fast because the *communication network* is well-connected amongst key stakeholders. For example, LERs concern middle-skill jobs primarily, and in a business environment that considers equity, adopting LERs or removing degree requirements can be a PR boost. This kind of news spreads fast in a *homophilic* ecosystem. Furthermore, learning providers like online schools or large universities often share information, best practices, and personnel. The same is true for large employers, who by and large use a similar amount of technological solutions that come from a limited set of technology providers, as evidenced by the fact that 39.2% of Fortune 500 companies use Workday as their ATS.<sup>19</sup>

It is difficult to surmise whether or not LERs will be able to follow the S curve of adoption, which typically takes off at about 10 to 20% of adoption. If the percentage of jobs that removed degree requirements is used as a proxy, LER adoption (which may be conceived as happening gradually or incrementally, with eliminating degree requirements as a notable first step) is at 3.6%.<sup>20</sup>

## Discussion

The jury is still out on whether or not LERs will be adopted, and the same could be said about what impact they will have on the equity of the learning and employment ecosystem. The equity advantages of LERs are clear, and opening opportunities for middle-skill workers who found themselves cut off from job positions and salary increases due to the lack of a degree. Conversely, LERs might be viewed as a sort of “second-class” degree, with official four-year bachelors degrees being seen in a better light.

There is also the possibility that the *disruption* that LERs are presenting in the field will follow the *disruptive innovation* process.<sup>21</sup> LERs may be seen as a lower cost version of a degree, and filling this gap in the market could allow it to take off without facing competition from the

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<sup>19</sup> Purcell, K. (2025). [2025 Applicant Tracking System \(ATS\) Usage Report: Key Shifts and Strategies for Job Seekers](#). Jobscan.

<sup>20</sup> Sigelman, M., Fuller, J., Martin, A. (2024) [Skills-Based Hiring: The Long Road from Pronouncements to Practice](#). Harvard Business School and The Burning Glass Institute.

<sup>21</sup> Christensen C.M., Raynor, M.E., & McDonald, R. (2015). [What Is Disruptive Innovation?](#) Harvard Business Review.

existing behemoths in the space: accredited colleges and universities. However, as Lepore would critique, the disruption would likely be absorbed by those behemoths, and colleges and universities might start making their own versions of LERs that they would award instead of or alongside their existing degrees.<sup>22</sup> This is certainly the case with ASU's Pocket Wallet, which is one of the leading LER solutions being developed.

LERs are a complicated but potentially transformative innovation in the ecosystem of learning credentials and career pathways. As the labor market continues to face shortages and displacements in the face of automation and AI, the market for LERs might increase as worker retraining/upskilling become more common and job seekers flock to skills and certificate programs. Employers may desire a technology that verifies credentials, enables comparisons across multiple candidates, and delivers clear evidence of a candidate's skills. LERs deliver these relative advantages, but the complexity of the technology combined with the difficulty in coordinating adoption amongst numerous stakeholders can complicate the adoption process. Although startups populate the LER space currently, the most dominant institutions of learning—colleges and universities—may end up absorbing the disruptive innovation represented by LERs.

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<sup>22</sup>Lepore, J. (2014). [What the Gospel of Innovation Gets Wrong | The New Yorker](#)