

Everything You've Ever Learned

Digital learning and employment records could empower workers, aid employers, and fuel innovation, but also require careful and deliberate design to be transparent and equitable.

Sofia spent 15 years as an active-duty member of the military. While deployed in Afghanistan and stationed in Georgia and Japan, she was involved in logistics planning and management as well as transportation and distribution services. But now, as she seeks to re-enter civilian life, she can't signal her qualifications to employers because she has no documented evidence of her skills.

Michael has been out of the workforce caring for his child with a disability. His last formal credential was awarded more than 10 years ago. Since that time, however, he fundraised tens of thousands of dollars for his church while providing significant medical support to a child with cystic fibrosis. He even organized a network of parents involved in caring for children with the condition.

Today, workers like Sofia and Michael find it difficult to leverage their full range of skills and experiences to secure quality jobs. Standard résumés and cover letters are poor tools for describing and verifying the many skills people acquire through life experiences, internships, entrepreneurship, on-the-job training and experience, and informal learning and online instruction. The hiring tools used by employers and job search sites to parse these documents play a powerful role in applicant screening and can create potentially misleading distinctions between candidates due to their reliance on technologies such

as content-based filtering. Likewise, as technological needs change rapidly, employers must compete for workers with particular talents, but have difficulty identifying people who've gained their skills outside of school.

Learning and employment records (LERs, formerly called interoperable learning records) offer a promising solution to the challenge of capturing and communicating the skills of individual workers to a wide selection of potential employers, and they may equip employers with the tools necessary to maximize hiring, promotion, and upskilling. LERs are digital records detailing a person's education, training, and work experience, and are verified through a distributed system similar to blockchain.

While LERs are not yet well known to the public, pilot programs for the technology are currently in progress across 150 universities and the Department of Defense as well as with such employers as Walmart, Google, IBM, and Salesforce. There is a growing consensus that the scheme requires standardization to achieve positive social outcomes, as captured in a recent white paper by the American Workforce Policy Advisory Board that defined the ideal LER platform as "transparent, relevant, equitable, private, secure, portable, shareable, verifiable, and, of course, interoperable."

If they can attain all of these characteristics, LERs could form an "internet of skills," empowering

individuals to share their knowledge, skills, and abilities as well as showcase their professional accomplishments. If they are implemented well, LERs will do a better job than résumés with some functions, such as empowering workers to find employment opportunities that maximize their full skill set and help them seek out complementary education and training opportunities. And if LERs are fully realized, in addition to reducing hiring costs for employers, they also have the potential to drive innovation in transformative ways.

Implemented at scale, LERs could empower workers, employers, and educators by allowing seamless movement between education and employment. Individuals would be able to mix, match, and stack their verified skills, while linking to and embedding digital files to show evidence of everything from coding to artwork, so that the sum is greater than the parts and the result is highly individualized. LERs may be particularly revolutionary in STEM fields—science, technology, engineering, and math—because they could capture the myriad experiential learning and practices that employers require but are hard to verify, allowing graduates to more easily change jobs, enter new industries outside of academia, and work in roles that may not yet exist.

Because this technology has the potential to transform society, LERs require careful, deliberate design to achieve more equitable, socially desirable outcomes, rather than intensifying existing inequities or disproportionately benefitting one group over another. Some of these concerns can be addressed solely through the technology. However, the majority of these concerns—including transparency, relevance, equity, privacy, shareability, and interoperability—will require collaboration between the technology developers and the stakeholders who will use them. As the movement to create LERs and its associated standards takes shape in the United States, we must deliberately ensure that they serve the needs of all, particularly disadvantaged workers.

A digital fix for a big problem

Currently, job markets discriminate against people like Sofia and Michael, who have sought-after skills like logistics, organizing, and fundraising, but are not able to formally demonstrate them.

Despite potential employers seeking workers with a high level of skills, they're likely to pass over candidates like Sofia and Michael. This is not a small problem; according to some estimates, as many as 30 million US workers without college degrees have the skills to earn an average of 70% more money than they do at their current jobs. There are 34 million adult workers in the United

States with some college and no degree, as well as 46 million who have a certification or license. And there are another 59 million adults with a high school diploma and no additional formal credentials. Many of these people could benefit from opportunities to formally express their knowledge, skills, and abilities, and employers could benefit from the expanded talent pool.

This problem extends to workers with formal educational degrees as well. Although degrees are frequently used as proxies for technical and “soft,” or fundamental, skills, even workers with diplomas have a challenging time capturing their nonacademic experiences on a formal record. Some studies suggest that at least a quarter of the labor force is overqualified for the jobs they hold, reflecting the inefficiencies inherent in the current system.

Today's labor market reflects a market failure caused by workers' inability to “signal” human capital attainment, and employers' inability to recognize the full range of workers' abilities, leading to a misallocation of human capital. This has three serious negative consequences. First, students and workers lack incentives to pursue as much informal education and training as they would if the labor market recognized and valued the knowledge and skills they gained, leading to lower aggregate productivity.

Second, a labor market that does not recognize and reward informally acquired skills fails to get the benefit of those autodidacts and self-starters who have talent and energy but lack the resources to obtain formal credentials. Accordingly, it also fails to reward these individuals. Workers spend up to three hours each week on self-directed learning, and a majority say they would put in even more time if they received professional credit.

People who have successfully launched a small business, changed careers, or led successful volunteer projects have the technical and fundamental skills—such as a growth mindset, persistence, and initiative—sought by employers. But these skills currently go underappreciated because these people lack traditional credentials or experiences that are proxies for these skills. LERs can mitigate employers' reliance on such proxies, which will also remove the related biases that proxies introduce.

Third, employers—and, therefore, the national economy—are less competitive when they cannot find workers with the latest knowledge, skills, and abilities in their given profession. This is especially true in STEM industries, where knowledge is evolving more rapidly than the curriculums of formal educational institutions.

The great promise of LERs is their potential to alter this dynamic by empowering workers to add on-the-job skills, extracurricular learning, self-directed learning,

and other relevant experiences to their LER and truly take ownership of the narrative of their skills. And this ability to market all of their skills could make workers more eager to master new fields and techniques. If properly implemented, LERs could increase opportunity for a wide range of workers while enabling more of the US workforce to take on higher-skilled jobs and increasing overall productivity.

At their worst, however, LERs could exacerbate existing inequities in the education and workforce system: workers with more resources will be able to showcase their enriched life experiences by adding more entries into LERs. One particular concern is whether adding entries to an LER will be prohibitively expensive, making it something only well-off workers can do.

In many cases, the very characteristics that could help workers without college degrees benefit from LERs could also put them at a disadvantage. For example, today's job searches are time intensive, which biases workers toward staying in their current position, even if it's not ideal. Finding a new job requires searching

employment opportunities. If these algorithms are not carefully vetted for bias, they could perpetuate or create new hiring biases rather than mitigate them.

Finally, the number of participants in this system raises significant concerns about data security and control of these digital learning records. If LERs become ubiquitous and necessary for obtaining employment, or even volunteering, there must be safeguards that maintain the user's privacy while also keeping the record free from tampering. Each LER entry must also be consistent with the relevant privacy laws—and with thousands of organizations adding LER entries, they will all need to follow the right protocols.

Designing LERs to support transparency

Maintaining transparency in LERs will require particular attention to the design of the technology platform that supports them: distributed ledger technology (DLT). DLT creates “distributed ledgers,” or digital spreadsheets of transactions and/or agreements that cannot be altered after being recorded. A copy of each ledger can be kept

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websites, developing a résumé or list of skills, completing an employment application, and participating in an interview. LERs could automate those processes (except the interview), significantly reducing barriers to seeking out new employment opportunities. However, reducing barriers to hiring and increasing job mobility could also result in employers investing less in incumbent worker training and embracing “just in time” employees through high-skill gig employment, continuing a US trend of market power shifting toward employers.

Similarly, there are important concerns about whether LERs could magnify the significant digital divides that already exist. The ability of LERs to provide more data on individuals' credentials and competencies alone does not necessarily mean more transparency or better information for workers or employers; it could, instead, lead to confusion. In the United States, there are more than 160 million workers, more than six million employers, 700,000 credentials, and 7,000 higher education institutions. With large amounts of information contained within each LER, it is likely that algorithms will be used to match workers with

on participants' computers all over the world, essentially creating a consensus on whether a recorded piece of information is valid. These transactions and agreements can also be encrypted, providing privacy.

DLT can also be used to automate or trigger transactions. For example, if an employee demonstrated a competency or completed a class, this could be marked in a digital ledger, which could be programmed to automatically award a credential and signal advancement readiness to human resources. These protocols could be developed and automatically applied at scale for workers, allowing for truly stackable credentials and a much more nimble and expansive career development process.

However, the use and adoption of DLT by education and workforce systems will shift both systems fundamentally toward decentralization. One effect of this is that the possession of educational transcripts or credentials will shift from the credential-granting organization to the worker. A third of students transfer institutions, and as lifelong learning becomes more prevalent, it will be more common for learners to enroll in multiple institutions of learning or nonacademic

training programs. Enabling stackable credentials with LERs means that institutions of learning will be held accountable to teach the competencies detailed in their LER entries for a course or credential, hopefully leading to more transparency. It may also lead to a greater adoption of “competency-based education” and a closer alignment between postsecondary education and career readiness.

LERs may also shift the power dynamics among postsecondary education and training providers as well as between learners and those providers. The adoption of LERs provides an opportunity for existing providers, or new ones, to gain market share as trusted providers to verify nondegree skills and credentials. Much like ecommerce and traditional retail, this new opportunity will shift the education and training landscape in unexpected ways.

One outstanding issue is whether postsecondary education providers or other organizations issuing LER entries will allow workers the flexibility to parse and selectively share data from an entry. For example, when applying for a job, an individual may choose to verify that she has earned a baccalaureate degree, but not the year it was earned. The permanence and security of LER entries means there must be safeguards to ensure individuals have significant control over the level of detail for a record they choose to share.

The most prominent drawback of DLTs is that they do not guarantee that the information they contain is accurate in the first place. If DLTs are used in LERs, there is still significant trust being placed in the issuer of a credential or other entry, and there is potential for fraudulent entries by bad actors. To maximize trust in LER entries, LERs can leverage existing systems for quality control—for example, noting which entries have been placed on an LER by an accredited organization.

As of this year, there were at least 27 LER pilot projects, spanning at least 12 different data standards and multiple competency frameworks. For example, the Lumina Foundation is supporting the American Association of Collegiate Registrars and Admissions Officers and the National Association of Student Personnel Administrators to work with their member institutions to expand the use of their Comprehensive Learning Records—LER precursors—to over 150 institutions. The Department of Education recently funded the American Council on Education to explore how blockchain technology (a type of DLT) can be used to document education, including funding pilot programs, and the Department of Education has encouraged the use of digital learning records.

Ensuring equity in the use and adoption of LERs

Aside from addressing the underlying technical standards, other measures are necessary to ensure that LERs do not perpetuate or intensify existing inequities in our system. LERs must be developed through a process that involves community organizations, educational providers (secondary and postsecondary), and employers of different sizes. Each LER pilot must have equity as a central design component and an implementation feature that can be tested alongside other measures of success. There are, at present, three separate and loosely coordinated efforts to address these challenges.

The first group of efforts is a grassroots approach by postsecondary institutions to develop digital learning records with cocurricular or extracurricular content, such as Elon University’s Visual Experiential Transcript and the University of California, San Diego’s Cocurricular Record. These efforts have been initiated at the campus level, as faculty and administrators respond to their students’ needs for a transcript that captures their learning and competencies outside of formal coursework.

The US Department of Defense is also involved in launching an LER prototype for military personnel that focuses on secure and verified digital learning records based on open data standards. The LER is meant to capture the learning and skills of military personnel, who master a wide variety of technical skills, such as logistics management and cybersecurity analysis, as well as human skills, such as adaptability and leadership, during their time in uniform. Many also enroll in formal training or coursework at higher education institutions.

There are a few dozen similarly ambitious LER prototypes currently being developed in the United States involving universities, community colleges, nonprofits, technology companies, employers, state and federal agencies, and primary education institutions. Because they are meeting different needs, each effort has different priorities for characteristics of the technology. Funders of these prototypes should also hold these various developers accountable to implement a plan for equity in the use and adoption of their LER prototype. Ideally, data from these initiatives would be publicly shared.

The second effort is a top-level movement supported by the federal government, large employers, and the US Chamber of Commerce Foundation (USCCF) to develop and deploy LERs for the purpose of workforce development. Described as a “network of networks,” this approach is attempting to cultivate a community of practice among LERs prototypes, focusing on developing the necessary infrastructure needed to scale the use and implementation of LERs. Part of what USCCF calls its T3 Innovation Network, and funded by numerous

foundations, including the Lumina Foundation, Google.org, Microsoft Foundation, Walmart Foundation, and the Annie E. Casey Foundation, this LER effort includes higher education institutions, employers, technology vendors, government, and nonprofits.

While some current LER pilots do seek feedback from individual students or workers who are participating, workers are not represented directly in the LER portion of USCCF's T3 Innovation Network. Large companies and universities are overrepresented in their participation in LER pilots, increasing the potential for the pilots to be skewed to represent their concerns and interests. The only way the interests and needs of workers are likely to be adequately addressed in the LER projects coordinated by the T3 Innovation Network is if they are directly involved in the network.

The third initiative is a movement by organizations involved in the development of standards to create a set of common data standards so that LERs can share interoperable data on credentials, skills, competencies, or other items. Interoperability is essential to equitable and broad adoption of LERs. DLT is still in its infancy, and the number of platform vendors is expected to significantly increase over the next five years. The fragmentation of the market, as well as the continued rapid evolution of existing platforms and creation of new platforms, strongly suggests there will be no dominant platform used by education and workforce stakeholders for years to come. Nevertheless, if there is consensus in the workforce and education communities around a data standard, interoperability can be maintained across DLT platforms.

The American National Standards Institute currently has no accredited standard for learning records. The Edmatrix directory maintains an up-to-date list of learning standards, with short descriptions for each. Currently, LER pilots are incorporating different standards, meaning that these pilots are theoretically interoperable. But without deliberate coordination, this approach falls short of the true promise of interoperability and self-sovereignty.

The LER community should also look to standards for accreditation of certifications and assessment-based certificates as models for the assessment and verification of skills for LERs. For example, the International Organization for Standardization developed ISO/IEC 17024 to facilitate a global job market by promoting an accepted benchmark for organizations operating certification programs. A standard for an organization that enters LERs could assure that an accredited organization follows appropriate protocols for privacy and that

its assessment process is unbiased with respect to gender, race, or nationality (among other criteria). Quality standards for organizations performing LER assessments and skills verification would increase trust in LER entries, benefiting workers and employers.

The internet all over again?

In the coming decade, LERs are poised to support the development of the “internet of skills.” This comparison of LERs to the internet extends beyond their function to their infrastructure, and also to their potential to upend the status quo. Like the internet, before they can be widely adopted, LERs will require additional innovation and investment in the technology, infrastructure, and capabilities, as well as standards and architecture upon which new applications can be developed. Most importantly, just as the internet set off a revolution in communication, commerce, and community building, LERs will transform education and workforce processes, policies, and communities in ways we cannot foresee.

As the United States transitions to LERs, millions of employers will change their hiring, retention, and promotion practices to take advantage of this new technology, directly affecting employment and career opportunities for millions of American workers. This shift will rapidly come to affect postsecondary education and training providers—particularly as LERs alter the importance of degree and nondegree credentials and their relationship to each other, change the way workers approach investments in upskilling and reskilling, and transform the value of on-the-job training.

These interrelated and potentially pervasive economic, social, cultural, and policy changes to the education and workforce system will require interdisciplinary, collaborative approaches to examine how workers, organizations, and society will be impacted by this transition, and to support equitable systems that include all workers.

During this period, while the fundamental technology and infrastructure of LERs are developed, there remain many outstanding questions regarding access, equity, and adoption that need to be addressed. The knowledge gained from research into these topics can prepare organizations, workers, and policymakers to develop structures that support individuals in their search for meaningful work.

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