

Education and Workforce

Jason Albert and Meredith Lee, March 2020

Claudia currently works two jobs and is in the process of moving to a new town, barely having time to open her mail. Instead of digging through boxes to find her high school diploma and continuing education certificate which are now years old, imagine she could – with the click of a button – share her relevant credentials with a prospective employer. This is something that blockchain-based credentials can make possible.

As the [American Workforce Policy Advisory Board's White Paper on Interoperable Learning Records](#) [1] states, "American workers, who are engaged in lifelong learning, deserve to have a way to translate their full education, training, and work experience to a record of transferable skills that will open the doors to higher wage occupations and careers."

Diplomas and more: the challenge of credentialing

From making sure that the people building public bridges and buildings are licensed, to ensuring that doctors and lawyers are qualified, the use of education and workforce records is integral to a dynamic labor ecosystem. Presently, California has regulatory regimes that require licensing of a number of professions. Engineers, Land Surveyors, and Geologists/Geophysicists must get licenses from the Board for Professional Engineers, Land Surveyors, and Geologists. Doctors must be licensed by the Medical Board of California, and nurses licensed by the Board of Registered Nursing. Attorneys must be licensed by the State Bar of California. In addition to licensing, all of these professions require verification of continuing education hours and training. There are rules on transferring licensure when someone moves to California with credentials from out of state, or when a California resident moves elsewhere.

And this is just the tip of the iceberg. The above licensing systems are operated by boards, as are many trade licensing systems, like those for plumbers and contractors. But there is also a wide range of professional licensing systems as well. All told, the [Department of Consumer Affairs](#) alone operates more than 150 types of licenses [2]. People who hold these licenses often have to prove that their licensure is up-to-date and that they have completed requirements such as continuing education. Employers will include this as part of a background check, and will conduct verifications as needed to make sure licenses remain current.

Beyond the licensed professions or trades, [95% of employers](#) [3] conduct background checks on applicants that include verifying educational credentials when applying for a job. Degrees are verified, transcripts are ordered, and so on. California has a labor market of [approximately 19.5 million people](#), meaning that with those entering and exiting the labor market, and switching jobs, millions of transcripts are ordered each year. The same is true of prior employment, which is often

verified: both the fact that the individual held the job, as well as whether they left the position in good standing. And once employed, people often want to share aspects of their working credentials with others. For example, they may want to share salary information with a bank to obtain a mortgage or an auto loan, or be able to prove their job role and title for membership in a professional organization.

At present, the verification of all of these credentials is often a time-consuming, paper-based process. An attorney, for example, must order a certificate of good standing from the bar to show his or her employer. While state bars, including the State Bar of California, have websites listing attorney status, these often aren't sufficient. They certainly aren't for the state bar itself, which requires out-of-state attorneys acting as registered in-house counsel to produce a paper certificate of good standing from an out-of-state bar annually.

Similarly, many employers require paper evidence of credentials from professionals such as doctors, nurses, and so on. And while the process of generating employment verification letters and salary verification letters has increasingly become computerized, oftentimes a paper letter is still generated and sent.

The reason for all this paper is concern about fraud and misrepresentation. Without adequate security and verification, electronic credentials are seen as too easily forged and thus unreliable. The result is a time-consuming system that adds friction in the hiring process, slows down bank loans and the like, and is so complex that businesses turn to intermediaries like background check companies to compile the information for them.

In addition to these challenges, it isn't clear that current credentialing systems accurately reflect the skills workers have. A liberal arts degree from a four-year institution, for example, is often considered a proxy for an individual's ability to reason and complete work, yet that same individual may gain skills on the job that have nothing to do with the content of his or her degree. More importantly, many individuals who don't complete four-year degrees have highly-valued skills and experiences gained through jobs or other means, but lack the ability to demonstrate these to employers in today's paper-based world.

Empowering the workforce, at scale

Blockchain-based credentialing systems can help remove this friction by solving the challenges that keep credentials from being shared online in a secure way, verified for proof, and under the individual's control. With blockchain, a party with which a credential is shared can verify both that it was issued by the purported issuer, by verifying the issuer's signature via a public key stored in a blockchain decentralized identifier (DID). Likewise, the party can determine that the individual sharing the credential is the authorized recipient, again by verifying his or her signature via a

public key stored in a DID. Finally, the blockchain can keep a record of revoked credentials, allowing the party relying on the credential to determine whether it is still valid.

Blockchain technology has been used by MIT for certificate dissemination since 2015 and for diplomas since 2017 [4]. Additional efforts from Foothill-DeAnza College, Arizona State, and other institutions have explored using blockchain and information about digital education records to help improve degree completion and student services [5]. In 2019, Dallas County Community College District announced a partnership with a blockchain technology company to provide students with lifelong access to their *entire* academic and continuing education records, with 100 educational institutions accepting the student-submitted records [6]. Indeed, one straightforward use case would be to enable easier transcript verification for community college students who then transfer to four-year colleges. Even earlier in life, students who move among school districts (as, for example, foster youth often do) could verify their academic achievements more seamlessly.

To empower all Californians with such a level of efficiency and bolster the workforce ecosystem, care must be taken to “stress test” the robustness of any new systems.

RECOMMENDATION 1:

With an estimated active workforce of [over 19 million](#) [7] that connects to a diversity of institutions locally and globally, the State of California should emphasize interoperability, security, and scalability when piloting the use of blockchain for education and workforce records.

In particular, frameworks for “privacy-by-design” and “privacy-by-default” that can be adapted to a variety of scenarios, while adhering to transparent standards, will lead to more viable long-term solutions. With the goal of contributing to an “education landscape that increases learner agency and promotes more equitable learning and career pathways,” the [Digital Credentials Consortium](#) of more than 12 higher education institutions is focusing on verifiable infrastructure for digital credentials of academic achievement, incubating standards openly for “learner-controlled, privacy-preserving credentials, in a manner that ensures interoperability.” [8]

A user-centered, iterative design process with stakeholder input could help the State to explore, test, and deliver technology and governance guidelines that support realistic use cases. The process should include representatives from a wide range of public and private educational institutions, informal learning communities, technology developers, policy makers, and the general public.

More broadly, a blockchain-based credentials system could empower a more diverse and nuanced set of credentials that reflect the pace and trajectory of modern work, including and facilitating accountability in the gig economy. Employers could quickly verify skills of their employees and training programs could more easily document and prove the skills of their participants. Notably, the agility and scalability of digital credentialing can provide a path to engage smaller institutions

and organizations, from new startups to community-led nonprofits, that historically have not had the resources to invest in credentialing or measure their workforce development efforts.

With the ever-increasing pace of change in the labor market, workers seeking to retrain or gain new skills are unlikely to take traditional paths of going back to obtain a formal degree. A broader-based credentials ecosystem powered by blockchain could enable more skills-based hiring and aid workers in navigating a changing labor market.

This dovetails with the ongoing efforts from California's [Future of Work Commission](#) [9], which among other things is addressing both "The impact of technology on work, workers, employers, jobs and society" and "the best way to ... ready the workforce for jobs of the future through lifelong learning."

RECOMMENDATION 2:

The Future of Work Commission should adopt recommendations on skills-based hiring and credentials, ensuring workers have the means to control and electronically share credentials in a secure and verifiable manner.

Sparking innovation and collaboration

Although education and workforce development applications may have specific requirements and needs, the overarching successes and "lessons learned" from exploring blockchain-based technologies, particularly those used for other public sector applications, should be reviewed to better inform new projects and improve existing initiatives. As a convener and bridge between disparate areas of the state and region, the State of California is well poised to spark multi-stakeholder discussion and provide a forum to seed many avenues for future collaboration.

In so doing, one can anticipate the need for supporting open and accessible education and training about blockchain and related technologies, to build greater fluency with emerging concepts and to identify opportunities for increased productivity and innovation. Educational efforts and content could include modular web-based tutorials, community training workshops, or a series of public-facing infographics or videos to provide a welcoming environment for learners of all backgrounds.

Whether the State collaborates with other organizations or hosts formal training or certification mechanisms on its own to generate a pipeline of skilled contributors, care should be taken to support a diverse and collaborative "community of practice". By prioritizing low-barrier-to-entry paths for individuals to collectively "upskill" and develop new competencies, we can establish a healthy ecosystem that inspires growth and shared learning. Highlighting the value of blockchain through technology demonstrations and emphasizing key transferable skills, products, or services needed for the public sector will serve as a mechanism for not only accelerating practical innovations and innovators, but also for promoting the sharing of resources and ideas.

RECOMMENDATION 3:

The State of California should enable and facilitate a results-focused forum for technology demonstrations that advance public sector applications, leveraging opportunities to re-use, re-purpose, and build upon existing efforts.

A natural role for the State would be to publish a framework of key questions, considerations, and paths forward for groups interacting with the California public school system and public service. These could help identify additional blockchain-based pilot projects, as well as provide an inventory for interested agencies to leverage for their own efforts.

Moreover, the State could encourage creative “cross-pollination” from other sectors and application areas by incentivizing and providing a safe space for transparent discussion of lessons learned and best practices. Finally, illustrating the different phases of technology adoption, and encouraging discussion of risks, benefits, and “readiness levels” needed along the way will provide much needed clarity for technology developers, policy writers, and solution adopters moving forward.

References

1. American Workforce Policy Advisory Board White Paper on Interoperable Learning Records https://www.in.gov/che/files/Interoperable%20Learning%20Records_FINAL.pdf
2. <https://www.dca.ca.gov/consumers/wll.shtml>
3. <https://www.esrcheck.com/wordpress/2018/07/02/napbs-survey-reveals-95-percent-employers-conducting-employment-background-screening-2018/>
4. <http://news.mit.edu/2017/mit-debuts-secure-digital-diploma-using-bitcoin-blockchain-technology-1017>
5. “[Boosting Degree Completion with Blockchain](#),” Inside Higher Education, July 2019.
6. “[Dallas County Community College District Students Receive ‘GreenLight’ Toward Ownership, Lifelong Access to Academic Records](#),” August 2019.
7. <https://www.bls.gov/eag/eag.ca.htm>
8. “[Building the digital credential infrastructure for the future](#),” a white paper from the Digital Credentials Consortium, February 2020.
9. <https://www.labor.ca.gov/labor-and-workforce-development-agency/fowc/>