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Permalink

<https://escholarship.org/uc/item/2tb939dm>

Author

Matkin, Gary W

Publication Date

2018-02-08

**ALTERNATIVE DIGITAL CREDENTIALS:
An Imperative for Higher Education**

February 2018

Gary W. Matkin*
University of California, Irvine

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ABSTRACT

Alternative Digital Credentials (ADCs) will significantly transform the relationship between higher education institutions and society. By providing fully digital, workplace-relevant, and information-rich records of an individual's skills and competencies, ADCs will render traditional university transcripts increasingly irrelevant and obsolete. Universities and colleges that do not adopt in some measure the ADC movement will begin to experience a slow decline in market position and patron support. Current usage of ADCs is emerging rapidly in the marketplace and is supported by standard-setting efforts and grant funding. Usage is accelerating due to the inadequacy of the traditional transcription systems, accrediting agency requirements, demographic shifts in learning preferences, open education, and hiring practices, among others. Institutions seeking to enter the ADC movement face challenges including, 1) establishing criteria for the issuance of ADCs, 2) designing icons to represent their ADCs, 3) determining the content disclosed in the ADC, 4) selecting a method (vendor) for implementing ADCs, and 5) considering the pace of technology and the immediate future of the ADC movement, including the advent of blockchain technology. This paper provides a rationale and pathway for the institutional adoption of ADCs.

Keywords: Higher Education, Digital Credentials, Transcripts, Blockchain, Job Markets

Alternative Digital Credentials (ADCs), sometimes loosely termed "badges," will significantly transform the relationship between higher education institutions and their students, and ultimately between higher education and society. The use of ADCs will, by providing a fully digital information-rich record of workplace relevant skills and competencies, render traditional university transcripts increasingly irrelevant and obsolete.

While degree attainment will remain important to employers, alternative forms of learning testimonials will quickly create a new ecosystem of skill and knowledge evaluation for the marketplace. The demonstration of acquired skills and knowledge will be more important than where or how the learning occurred.

There is a shift occurring. With ADCs, the student is the owner of the credential and has control over its dissemination. Currently, institutional dominion over learning attestation and academic transcripts prohibits public access through transcript fees and confidential dissemination. Student control over the choice of content and the avenues of dissemination of their individual learning accomplishments will have a profound effect on the higher education landscape.

Universities and colleges that fail to adopt the ADC movement will experience a slow decline in relevance and market position. While ADCs will not replace transcripts, they must be used in close combination with them and with non-degree learning projects. If not, the implicit contract between higher education institution and their patrons (governments, students and parents, business and industry) is changing because it requires that universities create a greater "value addition" and become more accountable in order to receive support.

* Gary W. Matkin, Ph.D. serves as the University of California, Irvine Dean of Continuing Education. In addition, Matkin is Vice Provost of the University's Division of Career Pathways, formally the UCI Career Center.

DEFINITIONS

The vocabulary in this emerging arena requires some clarification. In general, ADCs are *portable, useful, transferable, and easily understood*. ADCs offer an improvement over traditional transcripts because they “can contain specific claims of competency and web-based evidence of those competencies. They can be curated, annotated, and distributed over digital networks under the earner’s control” (Hickey, 2017, p.18).

“Alternative” means a replacement of what appears on traditional institutional transcripts. Non-credit courses fall into this category at most institutions. The types of non-credit programs are expanding rapidly, but, without ADCs the certification of learning in these programs is lacking. ADC does not include the digitization of traditional transcripts, since this would not be an alternative to the transcript but merely a different (and positive) way of distributing transcripts. The term “badge” is a catchall phrase that is inadequate for a detailed analysis of the ADC phenomenon. While “badge” and “badging” were early and popular terms in the field, the term was really just an analog—ADCs are “like” badges earned in other situations like scouting. The emerging depth and breadth of ADC capabilities have eclipsed the badge nomenclature.

“Digital” is the primary means of disseminating and transmitting information about the learning accomplishment. Digitization expands the means by which information about the learning accomplishment can be discovered and used, say, in hiring decisions.

“Credential” is the product of the enterprise, representing the attestation by a respected and trusted third party that learning has been accomplished or a skill has been acquired by an individual learner.

CONTEXT

The use of the word “imperative” to describe the ADC movement is not exaggerated. The movement represents the conjunction of a number of forces in action today. Academia tends to move slowly and embrace change reluctantly. The ADC movement is developing at the speed of technology, rather than the traditionally bound pace of academia. Accordingly, traditional learning environments should turn their attention to ADCs before nontraditional and tech savvy institutions encroach.

Here is a list and description of the forces that underpin the ADC movement:

1. **ADCs are already being widely used:** In June 2016, a study of a broad spectrum of 190 four-year institutions found that 94% of institutions were issuing some sort of alternative credential and 25% were issuing them digitally (Fong, J., Janzow, P., Peck, K. (2016).

Another study, conducted in 2014, found that 30% of the American adult population held some form of alternative credential (Marklein, 2014). This is proof that non-higher education institutions are offering these credentials. For instance, in March 2016, LinkedIn, through its ownership of Lynda.com, offered more than 50 “learning paths” related to certificates that could be posted on LinkedIn (Fong, et.al, 2016, pg. 3).

2. **Traditional transcripts are not serving the workforce:**

For all practical purposes, a college transcript is a static, standalone document that fails most of the market-facing tests we have come to expect in the age of the Internet. It is meant to be locked in a secure location and only shown on rare occasions—to graduate school admissions offices or hiring managers in HR departments, for instance—to verify attendance, grades, or degrees. The transcript does not capture what a student has learned nor does it capture the achievement outside of the classroom or the aspirations that may signal long-term career success. A student cannot sign an email with a transcript, so it is not tied in any useful way to digital identities. Employers cannot endorse valued skills or the relevance of a project. (DeMilo, 2017).

The disjunction between the form and dissemination of the traditional transcript, the needs of students and the workplace is ever more apparent. Transcripts are useful for entry into graduate school or continuing formal (degree) education, but as descriptors of abilities needed in the workplace, are basically useless, except to the most diligent reviewer. The transcript conveys a historically important roster of data – that is, how many courses were taken and what grades were earned. However, course names are often uninterpretable as abbreviated on transcripts. In addition, the actual content and learning outcomes of courses vary wildly across institutions and even within institutions. In

contrast, ADCs clearly describe and identifiable skills and knowledge and can even¹ provide proof of competency. In short, ADCs both complement and partially replace the traditional transcript. ADCs are a superior mechanism for the delivery of information about what the student actually knows and is capable of doing.

3. **Accrediting agencies are beginning to focus on learning outcomes:** U.S. regional accreditation bodies are requiring that universities evaluate their programs on the basis of defined student outcomes. Additionally, accrediting bodies are increasingly concerned about demonstrable impact of education. For example, what happens to students after they graduate? This is a reflection of the political forces that increasingly seek accountability from higher education institutions.

For instance, in May 2017, four senators introduced the “College Transparency Act”¹ that would

patch up the big gaps in college data transparency and finally provide students, families, and policy makers with an accurate picture of how colleges are serving today’s students (Harris, 2011).

Universities are under pressure and obligated to provide more comprehensive evaluation for learning that is directly relevant to life after graduation. Institutions that add ADCs to traditional transcripts will be able to respond to their critics with data, allowing the same institution that provided formal education to continue to provide and record subsequent learning.

4. **Young adults are demanding shorter and more workplace relevant learning projects:** Professional continuing educators across the world are well aware that there has been a major shift in the market for continuing education (CE) toward shorter, more focused, and intense courses. However, evidence suggests that shortening the context for learning yields diminishing results. ADCs can reinforce the connectivity of learning modules by concentrating on the certification of defined competencies.

This demand for “better and faster” delivery of educational content has led to the widespread practice of “modularizing” courses into shorter components and then “stacking” them into the larger context of the mastery of a subject. This shift is in accord with what we know about the preferences of the millennial generation—which include a demand for quick transmission of information and a direct relevance of learning to their daily lives. ADCs are critically aligned with this market trend and will be utilized first in CE units of major universities.

5. **Open education demands ADCs:** The explosive growth of open education, including massive open online courses (MOOCs), has pushed for the legitimacy of “free” education. For instance, major MOOC providers such as Coursera and EdX are now migrating their courses to some form of credit, including the offering of degrees. This “push” from for-profit organizations, whose existence rests on user affinities and usefulness, are fueling the ADC movement.
6. **Traditional higher education can’t keep up with the pace of technological change:** While universities have gotten better in responding to marketplace demands for new skills and the mastery of relevant bodies of knowledge, the traditional degree format and academic processes are really not able to keep up with technological change.

For instance, the approval for a new degree at many institutions can take two years or more. Those universities with effective CE units can fill the gap between the introduction of a new technology, and the formation of a formal degree to populate the workforce with competent people. But these alternative credentials still need a form of institutional learning assessment that is creditable in the marketplace. ADCs are an answer to this gap.

7. **Hiring practices will increasingly depend on digital searches:** Employers are beginning to use new hiring techniques and they are assessing employee’s online footprint (including “big data”) to make employment decisions.

¹ Sen. Orrin Hatch-Utah, Sen. Elizabeth Warren-Massachusetts, Sen. Bill Cassidy-Arizona, Sen. Sheldon Whitehouse-Rhode Island. The College Transparency Act seeks to lift the veil on postsecondary student outcomes and will empower students, college leaders, and policymakers with the information they need to make better-informed decisions.

At the most basic level, employers evaluate the success of students from particular universities and direct their recruiting efforts to those universities that yield the most competent employees. As digital credentials become tied to specific job skills and are published online, employers will be able to analyze thousands of potential applicants much easier. In time, employers will be able to judge the quality of badges being issued by particular organizations.

ADCs will become the building blocks for matching jobs to prospects for both applicants and employers as the marketplace for skills becomes more sophisticated.

8. **The ADC ecosystem is beginning to develop:** In 2013, the Open Badges Specification 1.0², sponsored by the Mozilla Foundation³, attempted to issue ADCs that worked across current and future platforms. This effort was followed by the release of Open Badges Specifications 2.0⁴, in December 2016, in addition to the adoption by the IMS Global Learning Consortium⁵ in January 2017.

However, the most significant effort is now known as the Credential Engine⁶, a program of the Credential Transparency Initiative (CTI), funded in part by the Lumina Foundation. The Credential Engine is intended as:

a first-of-its-kind credential registry that will allow users to see every credential—from college degrees to industry certifications and micro-credentials—represented in terms of competencies, transfer value, assessment rigor, third party approval status, labor market value, and much more (Gaston, 2017).

While in its early stages, this ambitious effort demonstrates the importance of the ADC movement.

9. **ADCs are more efficient to earn than traditional degrees:** Many degree-level courses cost between \$500-\$2,000 and are subject to the limitations listed above related to transcripts. ADCs, on the other hand, are shorter, more focused, and often much less costly for individuals, especially when combined with open education. Of course, ADCs can be offered in conjunction with larger, more extensive courses as those courses are analyzed into coherent skills and competencies.

CRITERIA

Some institutions are now struggling with setting standards for ADC publication. There also is confusion over the relationship of digitizing traditional transcripts and the issuance of new forms of learning assessment represented by ADCs. An institution is responsible in determining the criteria for what kind of activity and knowledge attainment it will consider for an ADC.

The criteria required to receive a badge are important to the overall design and success of a badge system because they make specific claims to learning. Criteria help set parameters that are useful to learners, evaluators, and those viewing the badge after it has been awarded. Establishing criteria of a badge provides a clear pathway to the learner (i.e. what does the learner have to do?) and establishes a claim of learning with the persons viewing the badge (i.e. the recipient of this badge had to complete these various tasks) (Demillo, 2017).

² The Open Badges Specification describes a method for packaging information about accomplishments, embedding it into portable image files as digital badges, and establishing an infrastructure for its validation. This specification includes term definitions for representations of data in Open Badges. These term definitions appear in the current [JSON-LD context \(v1.1\)](#) for the Open Badges Standard.

³ Mozilla created Open Badges in 2011 with funding from the MacArthur Foundation and other partners to develop a new way to recognize learning wherever it happened—online and F2F formal education.

⁴ Open Badges Specification 2.0 describes a method for packaging information about accomplishments, embedding it into portable image files as digital badges, and establishing resources for its validation. It includes term definitions for representations of data in Open Badges. These term definitions appear in the current [JSON-LD context \(v2.0\)](#) for the Open Badges Specification.

⁵ The IMS Global Learning Consortium (IMS Global/IMS) is a nonprofit, member organization that enables the adoption and impact of innovative learning technology.

⁶ Credential Engine, Credential Transparency Initiative (CTI), began in 2013. CTI's mission initiates the development of a centralized registry of credential information, a credential search engine. This effort was led by the George Washington University's Institute of Public Policy (GWIPP), Workcred – an affiliate of the American National Standards Institute, and Southern Illinois University (SIU) Carbondale's Center for Workforce Development, with support from the Lumina Foundation.

More specifically, institutions need to define why they would NOT issue an ADC. Currently ADCs are issued for a wide range of activities, from highly complex and extensive competencies such as Python⁷ programming, and risk assessment in project management, to simple participation in co-curricular activities or memberships in certain groups.

The following is a proposed set of criteria for a research university.

1. An ADC will not duplicate or displace a certification that does or would normally exist on an official transcript of the institution. Again, this honors the “alternative” of the title and eliminates the possibility that an institution could issue two different certifications for the same accomplishment.

However, it is allowable that a traditionally transcribed learning object (course, program, degree) could be broken-down into more granular components for which ADCs could be issued.

2. ADCs will be issued only for those competencies that are immediately relevant to the workplace. Relevance is determined by examining the skills needed in specific jobs, as indicated in a job listing or through the systematic survey of employer needs. This relevance may be related to the actual operation of a skill such as lab safety competency.

This criterion eliminates ADCs for learning such as the appreciation of the operatic form or understanding of the political situation in the Middle East.

3. ADCs will not be issued for trivial or irrelevant learning. Some competencies, even when related to the workplace, may be too small in consequence to issue an ADC, such as keeping a clean workplace or answering the phone cheerfully.

4. ADCs will be issued in accordance with a rigorous set of standards (in rubric form) that are designed to measure the desired learning outcome for the competency. The institution should retain records that document what learners know (and can accomplish) and provide the possibility for access to the actual work products of the learner.

5. Where ADCs are issued in the same subject area at two or more levels of competency, the levels are clearly defined and available for public inspection. While the desired ADC indicates a “mastery” level, there are useful states below mastery that may be relevant in the marketplace, for example, a computer-programming competency (such as introductory, applied, and mastery.)

6. All ADC individual assessors or assessment processes must meet high standards of competency and experience. This criterion is the basis for institutional relevance in the process. For the most part, some form of competency-based assessment or evaluation should be utilized in the assessment process, requiring a clear relationship between the assessment and the actual application of the knowledge or skill in the workplace.

These proposed standards should be considered as a starting point for an institution. As more examples of the ADC utility become apparent, best practices will emerge and result in additions or changes to these proposed standards as they evolve.

ICONOGRAPHY

What may seem to be a rather unimportant issue in the ADC movement, but which reveals deeper issues, is the design of the “icon” (or badge) used to represent the learning outcome. Determining the visual image to indicate a learning outcome is one of the earliest steps in implementing an institutional ADC system.

What shapes and colors should be used? What words should appear on the icon? Should there be differences between icons to indicate different kinds of badges (introductory, intermediate, and total mastery)? How should the icon convey the “brand” of the institution?

To answer these questions, institutions are compelled to think about what they will be offering and how the market (students and employers) will react to the images used to convey the initial ADC information. Thus, the process of designing ADC images pushes institutions back into an early consideration of the standards proposed above.

⁷ Python Software Foundation promotes, protects, and advances the Python programming language and facilitates the growth of a community of Python programmers.

While it is still early in the process of ADC icon design, a review of existing badges (both effective and non-effective) suggests that the following principles may apply.

1. The icon should indicate, in writing and visual representation, the issuing institution and the unit within the institution that offers the ADC (i.e. the School of Engineering).
2. The icon should indicate the learning area represented by the ADC.
3. The icon should be readable at a glance.

Meeting these simple criteria is quite challenging, given the technical limitations and the uncertainty of future directions for institutional ADCs. As with many elements of the ADC movement, the size, shape, color, and messages of icons will evolve.

CONTENT

What information should an ADC contain? Sometimes called “metadata,” the information contained digitally within the ADC is relatively standard at this point in the movement. According to Acclaim’s⁸ publication, “Open Badges for Higher Education,” (Acclaim), metadata should contain:

1. The defined outcomes required to earn the badge and the demonstration of a student’s competence.
2. The qualification of the learning provider, credential sponsor, or issuing organization and their trustworthiness.
3. The relationship between the badge and larger programs, professional learning pathways and/or larger skill sets.
4. Verification of the badge that learners identify as relevant and secure trusted communications about their qualifications, competencies, and skills.

In addition to the ability to post this information and specify the duration of an ADC, (if and when it expires) is also necessary. Important for marketing purposes is the ability of anyone opening an ADC to go directly to an issuer’s website to find out more about, and even enroll in, the ADC program.

These utilities also can provide large amounts of “back end data,” indicating how many badges have been issued, to whom, and how the badges are being used. This information can be tremendously informative; not only for marketing purposes, but also for researchers seeking in-depth knowledge of how learners are actually disseminating their skills and competencies.

IMPLEMENTATION

Institutions desiring to enter the ADC movement and implement a system for their students and communities have a choice—to contract with a third-party vendor such as Acclaim, Credly, Badgr, and Parchment, to name a few, or to wait. These utilities promise cutting-edge and comprehensive ADC functions along with the assurance of ADC security and integrity (but see “blockchain” below).

Earlier in the ADC movement, it might have been logical for an institution to create its own software variant of its transcript system to handle ADCs, but today it is clear that the requirements and evolution of the systems are beyond the capabilities of any institution to develop for itself.

It makes the most sense to partner with a third-party vendor that can offer high-quality service and the frequent addition of new features. The caution is that embarking on an implementation pathway requires significant resources, not only in terms of payment for third party software and services, but also in terms of institutional costs such as salaries and time and effort in setting up and maintaining a system. In most cases, institutions will have to engage the faculty in decisions about the issuance of ADCs and this deliberative process can take time and resources.

Waiting is also a sound option for institutions that clearly intend to enter the ADC movement. Waiting is logical because of a new technological development called blockchain⁹, which will have a significant influence on how ADCs are secured and transferred.

⁸ The Acclaim platform is a highly scalable, enterprise-class badging platform that is built on Mozilla’s open standards and designed for awarding and tracking verifiable credentials in a secure environment.

⁹ Blockchain technology is a secure and transparent platform to create a global network for higher learning.

BLOCKCHAIN

Blockchain¹⁰ is an emerging technology that secures digital assets and allows for secure transfer from one user to another. It is so secure in these two respects that it is the technology underlying the existence of cryptocurrencies such as Bitcoin¹¹.

Blockchain has been described as

a global, cross industry and disruptive technology, which is forecast to fuel the growth of the global economy for the next several decades (Grech, Camilleri, 2017, pg.12).

Blockchain technology records an individual transaction (say the issuance of an ADC to a student), notes the date and time, tells who the sender is (the issuing institution), describes the “asset,” or value conveyed (an ADC in project management), and identifies the receiver (a student). All of this data is stored in an unhackable system that is constantly recording transactions and transfers.

Once a transaction is recorded and time-stamped on the Blockchain, it is impossible to alter it or delete it. Blockchain allows for “certification” to take place—the issue of a statement from one party to another that a certain set of facts are true (Grech, Camilleri, 2017, pg. 23).

It's easy to see that this will become the basis for the expanded use of ADCs, even from this very superficial description of blockchain technology. There are several non-technical barriers that will delay widespread adoption, including difficulties in agreeing on standards for issuance over blockchain and the issue of who or what will “own” the blockchain ledger for ADCs. In addition, the technological difficulties in implementing blockchain will drive primary users, such as higher education institutions, to new dependencies on third-party providers.

While the use of blockchain technology in education is in its infancy, predictors see several usage scenarios for blockchain related to ADCs (Grech, Camilleri, 2017, pgs. 95-100). The first prediction is the use of blockchain to permanently secure certificates.

Unique signed digital certificates are given directly to the users (Grech, Camilleri, 2017, pg. 95).

A second prediction is the use of blockchain for automatic recognition of transfer of credits. This would replace the current cumbersome system of “articulation” among programs. The use of ADCs would promote the “stackability” of credentials issued by different institutions.

A third prediction is the use of blockchain as a lifelong learning passport.

Learners would store their own evidence of learning received from any source (Grech, Camilleri, 2017, pg.98).

This would be instantly and authentically verifiable.

CONCLUSION

Digital credentialing is part of a complex of factors that are combining to transform higher education. The coming obsolescence of transcripts is both a symbol and a tangible reality of the changes at play—changes caused by demographics, technology, the place in society of higher and continuing education, and the way we think and learn. ADCs are causing us to look critically at the context for learning in modern society, how learning is transformed into knowledge, and how that knowledge is certified and attributed to individuals.

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¹⁰ The blockchain provides a rich, secure, and transparent platform on which to create a global network for higher learning. This Internet of value can help to reinvent higher education in a way the Internet of information alone could not.

¹¹ Bitcoin (BTC) is a decentralized and anonymous peer-to-peer digital currency.

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