Colorado Community College System Digital Badge Initiative

A New Paradigm for Credentials

The Colorado Community College System (CCCS) is unique across the nation because of its dual oversight of the state's community colleges and vocational education. Because of its unique position, CCCS can position itself to supply educational, industry, and workforce demanded credentials while enhancing and complementing secondary and post-secondary education pathways with digital badges. This paper explores how CCCS can leverage digital badges as micro-credentials to document criteria-based accomplishments and provide a portable, verifiable mechanism to display competency in new subject areas, coursework, certificates and degree programs.

Representatives from four colleges and the System office who are interested in providing an overview of how digital badges should function and be managed within our system collaborated to prepare this white paper. Each of the representatives should be considered experts in their colleges on the subject and should be considered key players in implementing a digital badge pilot on their campuses.

Overview

The Colorado Community College System (CCCS) is unique across the nation because of its dual oversight of the state's community colleges and vocational education. Because of its unique position, CCCS can position itself to supply educational, industry, and workforce demanded credentials while enhancing and complimenting secondary and post-secondary education pathways with digital badges. The term badge has different meanings for people. Four our purposes, the term badge equates to digital badges or micro-credentials and represent a shift away from attendance-based certificates to criteria-based accomplishments and provide a portable, verifiable mechanism to display competency in new subject areas, course work, certificates, and degree programs.

Digital badges

Digital badges are an electronic representation and recognition of skills and credentials earned by a learner. In order to receive a digital badge, participants must meet a learning outcome or demonstrate their content mastery or new skills. Two archetypes of digital badges are emerging:

- **Participatory badges** are achievement oriented, involve surface learning, and tend to be extrinsic motivating.
- **Skill based badges** show mastery of skills, meeting competencies through deep learning and tends to be intrinsically motivating. Learners earning skill based digital badges meet set levels of competencies that are evaluated through authentic assessment, rigorous requirements, and/or industry certifications.

Educators and innovative industry leaders agree that digital badges are evolving into a key credential that can be used to meet current education and workforce needs. Therefore, a badging system needs to be framed in a way that's acceptable to higher education and workforce. CCCS needs to be proactive in the establishment of a digital badge system or they will be reactive in dealing with proprietary and for-profit digital badge systems.

Digital Badges and Known Credentials: Proving Competency and Consistency Across Multiple Institutions

Nationally and internationally there is an active conversation around the subject of a one-to-one match between digital badges and known credentials such as courses and certificates. The Lumina Foundation's *Connecting Credentials Frameworks* uses competencies as common reference points to help understand and compare the levels and types of knowledge and skills that underlie degrees, certificates, industry certifications, licenses, apprenticeships, badges, and other credentials. CCCS is fortunate to have a Common Course Numbering System (CCNS) for all courses taught at the colleges that represent a prescribed set of competencies

What CCCS Provides:
- Consistency across secondary and post-secondary courses through the use of the CCNS.
- Courses within the CCNS carry the same prefix, number, title, credits, description, competencies and outline.
- Ease of transfer for students from one community college to another and from the community college to the four-year educational institutions through articulation arrangements between high schools and the community colleges (CCCS.edu).

Industry and employers' value CCCS certificates and degrees because they represent training and preparation designed to meet workforce needs. The CCNS provides consistent representation of specific competencies across multiple institutions. To achieve the same value in CCCS digital badges, it is important to apply the same transparency to the development of badge competencies.

Digital badges
- Provide a validated indicator of an accomplishment, skill, quality, or competency acquired in various learning settings (formal or informal, online, or traditional classroom.)
- Show verifiable evidence about the skill level, competency, and accomplishments of the badge earner.
- Add value to our institutions because they allow institutions to respond to the emerging demand for alternative credentials and connecting credentials to career pathways.

The increasing focus on competency based education combined with the demand for alternative credentials, positions CCCS's digital badge initiative in a supporting role to help the system achieve two of the Colorado Community College System's Strategic Plan 2015-2025 bold solutions:

- Transform the Student Experience
  - Beginning in Fiscal Year 2017, develop 10 competency-based courses per year

- o Design three accelerated and competency-based strategic pathways per year in statewide disciplines with high student demand beginning in FY2020
- Create Education without Barriers through Transformational Partnerships
    - o Develop competency-based criteria to grant credit for prior experiences in order to widen educational pathways while reducing time to credential completion
    - o Design experiential learning opportunities in all programs.[1]

Digital badges help fulfill the bold solutions of CCCS's Strategic Plan because:

- They are **learner focused, community centered, and industry driven** micro credentials.
- They provide **validation of skills and competencies** but also support learning that is actively in progress.
- They **represent scaffolding of skill** acquisition through digital badge based learning pathways and competency maps.
- They improve a person's ability to clearly **demonstrate mastery of skills and knowledge with evidence** rather than the traditional measure of learning associated with seat time.
- They provide a wealth of information contained in the associated metadata including:
    - the issuer
    - date of issue
    - description of criteria/competency
    - evidence of meeting the criteria/competency
    - standards associated with the badge
    - expiration date if needed

All of the metadata contained in the digital badge can be validated and verified to ensure that the information cannot be tampered with, altered, or modified. Digital badges give employers and workforce centers immediate access to the evidence of learning the digital badge represents.

Badge earners
- Have the ability to collect and curate their knowledge, skills, and experience from across the web in one place.
- Retain control over whether to publish their badges or keep them private.
- Have an easy way to show a portfolio of skills without third parties having to wade through a mountain of data.

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[1] Colorado Community College System, Strategic Plan 2015-2025: Goals, Key Strategies, Key Performance Measures, https://www.cccs.edu/wp-content/uploads/2012/08/StrategicPlan.pdf

Digital badges also contain information not normally found on a traditional transcript. The metadata is "baked" into the badge, meaning that the data are embedded into the image file. The metadata include what the badge represents, who earned it, and who issued it. Other data include an expiration date if the credential is based on specific time sensitive certifications. Although digital badges are static at time of issuance, authenticated changes can be entered to reflect the badge earner's new name, effective dates of the credential if the original dates are wrong, recertification, and additional evidence that may be added to a badge.

Additionally, a digital badge can be revoked for a variety of reasons such as a credential is no longer valid, the wrong badge was issued to an individual, and an earner does not meet the criteria to maintain accreditation for the credential represented by the digital badge.

Challenges

There are several challenges Colorado colleges face when starting to start to develop and issue badges. These include press releases on badges, assuring badges are in demand and useful for industry, identifying a bridge platform, and increasing student demand for badges in educational settings.

1. **A spotlight on CCCS badges by the press and media:** Recent CCCS media press releases in 2015 stated "CCCS is developing a new designation to improve students' ability to gain employment and to meet industry demands. The designation is called a badge. At this time the focus is on programs for the manufacturing industry."[2] Information from the initial news release was picked up and repeated in several regional and national publications. With the spotlight on Colorado's advancement into digital badges, it is urgent that CCCS provide a use case or proof of concept of digital badges.

2. **Lack of formalized processes and framework for badges:** As CCCS develops its digital badge system, collaboration among different stakeholders (postsecondary education and training institutions, state and local certification and licensing agencies, workforce centers, businesses and industries, civic organizations) is essential as the comprehensive digital badge ecosystem framework is developed. A digital badge ecosystem consists of issuers, earners, and consumers/receivers. The ecosystem includes the interwoven processes of creating, managing, issuing, earning, receiving, and displaying badges with the technology which supports the validation, recognition, endorsement, and overall acceptance of badges by relevant stakeholders. This is a complex system which relies on

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[2] Colorado Community College System, The Colorado Community College System Develops a New Designation to Improve Students' Ability to Gain Employment (Press Release, June 30, 2015), https://www.cccs.edu/2015/06/the-colorado-community-college-system-develops-a-new-designation-to-improve-students-ability-to-gain-employment/

stakeholders agreeing on the value of digital badges because of the competencies and evidence of mastery of competency contained in the metadata of the digital badge.

3. **Selecting an appropriate badging platform that is secure, reliable, and can be integrated within existing student record systems:** A key barrier to the implementation of a digital badge platform is the difficulty post-secondary institutions have in selecting an appropriate badging platform. The emerging digital badge platform marketplace has produced many digital badge beta platforms, not-so-reliable plugins, platform-hosting issues (spam, security, maintenance costs, administration), and even unexpected unclear public-hosting policies.[3] Additional items to be addressed in the selection of a badging platform include users' privacy, secured longevity of the contents and metadata, and integration within existing student record systems.

4. **Prospective demand from K-12 students**: Students from K-12 institutions in Colorado, including Aurora Public Schools and Denver Public Schools, receive badges for their K-12 experiences. Digital badges help students display the skills needed for a post-secondary program through the competencies mastered in workshops attended, awards won, and specific projects completed. While students may not be able to gain post-secondary credit for their learning; however, badges would show progressive learning. Because of the ability of K-12 students to more fully engage in their learning journey by earning digital badges, they are going to increasingly demand digital badges as they progress to their post-secondary educational journey.

Digital Badge Platform Design

Digital badge development can occur at the local, state, or national level of an organization or institution. Because digital badges are equivalent to micro-credentials issued by an institution, establishing criteria regarding who has the authority to issues digital badges within an institution or company is critically important. For the purpose of this paper, the authority to issue badges is defined as an individual, department, or institution that CCCS authorizes as a digital badge issuer. A digital issuer has the ability to define a competency; design the assessment for that competency, and design the image and metadata.

As CCCS moves forward in the creation of a digital badge ecosystem, it is important to ensure that digital badges issued by any CCCS authorized entity are enhancements to an established course or program of study and remain consistent across all CCCS colleges. To facilitate badge consistency across multiple institutions and ensure the value of digital badges as micro-

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[3] W.I. O'Byrne, Challenges in launching and hosting an open, digital badge initiative, July 31, 2013, http://wiobyrne.com/challenges-in-launching-and-hosting-an-open-digital-badgeinitiative/

credentials, it is important to apply the same transparency to the development of badges as the CCNS has provided for courses.

Once the badge has been designed, a host for the online display must be identified. This online display is referred to as a badge platform. A badge platform affords the ability to track the location of evidence and supporting details so that digital badges are portable. We recognize that badge earners bear the responsibility to manage their individual portfolios of digital badges received including a storage solution. Current options for the storage and display of earned badges include web-based portfolios (e-portfolios), the Mozilla Backpack, and some social media apps. Web-based tools give badge earners the flexibility to store badges earned in one central, portable portfolio tailored to each instance of display. Given that adult learners may earn badges from multiple organizations and businesses, a digital badge platform system should allow for managing and sharing a holistic view of students, not only their learning-related accomplishments while at any CCCS institution.

A concern of any issuer of digital badges is that a badge platform offers many levels of data contained in the metadata stored in badges themselves, primarily: requirements, achievement evidence, and timestamps. As new digital badging platforms enter the marketplace, each badging platform, even if built with the Mozilla Open Badge Code, uses slightly different terminology to express knowledge/skills/competences. The inability of metadata to be transferred between digital badge platforms and the lack of consistency among badging platforms encoded extensions within the digital badge metadata are major challenges to the establishment and maintenance of a large scale digital badging ecosystem. It is important to understand that even though CCCS considers itself a system of colleges, CCCS is truly 15 separate entities (13 brick and mortar institutions, CCCOnline, and the system administrative offices) that would be interacting within a digital badge ecosystem, in addition to Colorado businesses, industries, workforce centers, and other educational institutions.

An additional consideration is an understanding of the way in which the new micro- credential system would fit into the existing student management system. To deliver the value promised by digital badges, it is important that digital badges and the associated metadata be stable for 5-10 years. **Competencies identified in digital badges need to granular and document competency based learning**. Until an integrated competency-based student information management system is available within our current course/certificate/degree student information management system, a digital badging management system should run parallel to the existing Banner system.

What Solutions are Available

As we establish a large scale (enterprise) digital badge ecosystem, student learning outcomes are strengthened through identifiable, granular, observable units inherent in an evidence based badge design that is consistent within the metadata code, Open Badge Standard. It is important that the uniform terminology, consistent extensions, and the same competency semantics are used. The essential consistency can only be achieved if all CCCS institutions use a system-wide badging platform with a uniform process to establish and issue digital badges. Additionally, any badging platform must allow an individual institution to retain ownership of the metadata as well as downloading and transfer capabilities of the metadata.

With this information in mind, in a series of meetings, the taskforce generated a statement of work and criteria needed for a pilot and enterprise badging platform solution to be used to evaluate existing badging platforms. The CCCS Badge Platform Pilot-Enterprise Request for Proposal (appendix A) was sent out to the leading badging platforms: Acclaim, Badger, Badge List, Credly, CSULogics, and Red Critter. Utilization of a standard set of criteria allowed the taskforce to compare like items across many platforms.

Development and deployment of a pilot digital badging platform averaged 3-6 months, and an enterprise solution based off a year pilot varied in timeframe depending upon whether implementation is phased or launched system wide.

Recommendations

To achieve the development of a digital badge system which include evidence of the specific skills and competencies:

1. **Implement a timeline** in which one or more of the suggested pilots can be designed and running within 6 months.
2. **Secure $5,000 in funding** (in the current CCCS 2015-2016 budget) for the development of a digital badging platform.
    a. **Select one of the top 2 badge platforms** (see **appendix B and C**) which are comparable in price and functionality for the digital badge pilot.
        i. Understanding that digital badge ecosystem is expanding to K-12 schools, Colorado universities and workforce centers, **it would be very beneficial to have CCCS colleges using the same platform** to allow for greater data mining and seamless feedback loops among K-12, 2-4 year institutions, workforce centers, and Colorado employers and industries.
    b. **Develop a limited pilot Technical Math for Industry digital badges**.

        i.   Technical Math **digital badges identify proficient or mastery achievement with academic content** directly related to competencies needed in the workplace. For instance, students can take the Technical Math MOOC assessments for Basic Mathematics and badge in the one or all of the 4 competencies: Ratio, Proportion and Percent, Units of Measure, Numbers, Powers of 10, and Scientific Notation. Community College of Aurora's CNA program has many applicants for the limited number of student slots, and while math is not a required course to enter the program, instructors know students who have mastery of ratio proportion and percent and units of measure have more success while in the program and are more likely to complete the program. A digital badge system isn't just a transcript and work portfolio; it's a way to structure the process of education itself.

    c.   **Develop a limited pilot for Advanced Manufacturing digital badges.**

        i.   NIMS credentials are industry-recognized national standards and third party objective assessments which help secure jobs in the manufacturing sector. **NIMS digital badges help students demonstrate mastery performance** in required competency or group of competencies which are valued in jobs such as certified machinist, toolmaker, or CNC setup programmer. Each badge allows the employer to click through to more detailed levels of evidence and explanation—documents, assessment results, hyperlinks, video, and more.

    d.   **Develop a limited pilot for online faculty development** digital badging project with FRCC, CCA and CCD.

        i.   Many instructors enhance their teaching practice through workshops, seminars, and other non-credit programs; digital badging offers a flexible, personalized way for faculty and staff to plan, document, and share their accomplishments. In contrast to attendance or participation in a workshop or conference, a **digital badge indicates that the faculty member has met some external criteria in order to receive it**. Implementation of faculty development digital badges programs and initiatives offer numerous initiatives for instructors for improving the quality of teaching and thereby enhancing the student learning experience.

3. **Develop a system wide enterprise solution**, to follow the pilot model within 12-15 months after the pilot.

    a.   Approximate start-up cost for a system wide enterprise solution annually is $65,000 for unlimited earner accounts under the CCCS brand.

          i.   Development of white label solutions (individual college branded badges) for each of the 13 brick and mortar colleges is **approximately $4,950 per college**

    b.   Personnel expenses would include instructional designer, visual designer and a curriculum & program competency alignment manager funded positions for approximately $300,000 per year with fringe.

4. **Align the development and management of digital badge competencies** with our current common course numbering system.

    a.   **Create a central digital badge management and processing system** including uniform policies and procedures for badge documentation in credit and non-credit courses. It is anticipated that badge requests from colleges could include non-credit competencies, professional development for faculty and staff, Career and Technical Education (CTE) competencies, guaranteed transfer (GT) competencies, student work experience and industry certifications and a centralized management system ensures consistency within the badges and adds value to the CCCS brand.

5. **Use the current prior learning assessment (PLA) policy and procedures** for processing any outside CCCS digital badges into any CCCS college identified program.

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Appendix

Appendix A

BACKGROUND, OVERVIEW & GOALS
The Colorado Community College System (CCCS) is seeking information for a badge platform that

1. Supports CCCS Badging Initiative growth, use, and reporting from pilot to system wide adoption at all 13 community colleges; CCCS departments, such as CCCOnline, Educational Services, Special Projects, and others; system partners, and students.
2. Provides an enterprise solution for a white label product and white label branding for each of the 13 colleges and CCCS departments with three modes of entry into the badging dashboard for three types of users.
3. Provide badge earners with access to their badges that does not require single sign on or having users go through a gate to claim their badges.

STATEMENT OF WORK
CCCS would like an estimate and degree to which the following features could be provided.

Required Features:
1. White label badge platform for all 13 colleges
2. Ability to scale from pilot to system wide implementation for 13 community colleges, various CCCS departments, system partners as needed, and students. CCCS includes over 150,000 students and issues over 17,000 degrees and certificates annually.
3. Ability to issue, track, and generate reports on badges at the system level (All colleges), college level, and department level.
4. Ability to allow for at least three levels of users: System Administrators, Editorial (allows badge creation and alignment with Student Learning Outcomes), and Instructor level (allows issuance of badges to students).
5. Ability to be managed at the system level, and also allow for settings and branding at the college level.
6. Ability to issue badges through auto generated email, allow badge earners to select which badges to display, and allow display of earned badges on earners media of choice such as Mozilla Backpack or similar backpacks/ portfolios and social media such as LinkedIn.
7. Ability to interface (API or LTI) with and import/export from D2L Learning Management System. Ability to stay connected to D2L through continuous improvement.
8. Ability to import data from a MEP installation of Banner for student-level data.
9. Ability to export data in bulk in CSV format.
10. Provide dashboard for administrator, editor, issuer (faculty), and student dashboards that allow:
    a. Creation of graphical badge and metadata based on the Open Badge Platform

      b.   Display Issued Badges in a Catalog

      c.   Issue Badges

      d.   Integration with Social Media

      e.   Generation of Reports

      f.   If your solution also allows hosting of badges

         i.   Display Badges Earned

        ii.   Allow Badge Earners to manage their badges

      g.   Intuitive and easy to use in creation, alignment and issuing of white label badges.

Features that would be nice, but are not required:

1. Badge design and style guide
2. Server hosting, monitoring, and maintenance

"Cherry on the top" Features:

1. CCCS "owns" the metadata and will be able to move metadata to future platform(s) when technology enables convenient transfer.

2. If supplying a badge hosting solution in addition to the badge issuing platform, it is important for the hosting platform to have the ability to import badges from other providers and platforms. Students can collect badges from multiple sources into a single "briefcase" that is then portable for the student.

Vendors should address the following questions:

1. What is your pricing structure? Is there an annual licensing fee? Per user charge to maintain issued badges? Storage rate charge? Number of badges issued? Administrative user accounts? Can you give prices based, as appropriate?

    a.   If your pricing structure is to charge per student, do we have to purge our data and/or are we charged per student even if they're no longer at the institution? How long does the software keep historical data?

2. Is your offering an on-site solution, or is it cloud-based? If the system is installed on-site, what system requirements would be involved (e.g. Hardware or VM, operating system, CPUs, memory, etc.)?

    a.   If there is a cloud-based solution, what data security measures are taken to protect student data? Has your company been certified in any way as compliant with student privacy laws?

    b.   If cloud-based, how much storage will be available to us and how is it managed?

    c.   If cloud based, how do you securely connect to the local CCCS servers for data transfer?

    d.   How often are maintenance and/or upgrades needed for the solution? What is the expected downtime for maintenance windows?

3. Do you have a help desk to support end users? If yes, what are its hours?

4. Does your system generate e-mails, if so do you host your own SMTP server?

5. Will we be able to download data and keep on our computers? If not, for how long will we have access to the data?

    a.   Can we work with extracted data without having to programmatically tie into the actual database or inject other data?

    b.   Do we own the data?

    c.   Can we access the raw data anytime we want?

    d.   What is the data backup schedule (frequency of data backup)?

    e.   If we can export the data in bulk, who would do that? You, the platform company, or us?

6.   Is your system WCAG Level 2 AA compliant? If not, what is your plan to reach WCAG Level 2 AA compliance?

7.   Do you ever have to customize this integration and if so, is it included in the price?

8.   Do you support integration with any Learning Management System? What about D2L (Bright space)? Canvas?

    a.   If yes, is it LTI or API based?

    b.   If yes, what tables are read and what tables are updated?

9.   Do you support integration with any student management system such as Ellucian Banner in a MEP environment?

    a.   If yes, what tables are read and what tables are updated?

10.   Can you provide us with contacts at other schools that are using your software for a badging platform?

Glossary

Badge: Badge is a representation of a skill, learning achievement or experience. Badges can represent competencies and involvements recognized in online or offline life. Each badge is associated with an image and some metadata.

Digital Badges: *A digital badge is an online representation of a badge earned.*

Metadata: Metadata provides information about what the badge represents and the evidence used to support it. Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information. (National Information Standards Organization)

Open Badges: Open Badges take digital badges one step further. They are more suitable to be used as credentials as they have information about the learning experience baked in. Open Badges can be validated by anyone wanting to check up on an individual's claim to knowledge or skills.

Open Badge Standard Code: Open badge code is node.js code and represents badges in json data blobs embedded in png files.

Open Badge Infrastructure (OBI): Open badge infrastructure technology supports independent badge issuers and displayers. OBI includes the metadata specification, APIs, verification framework, Backpack and software tools.

ROLES

> **Earner:** A badge earner is someone who earns a badge (either by applying or being directly issued with it). The earner can use their Backpack to manage and share their badges.

> **Issuer:** A badge issuer is an organization or individual who issues Open Badges to their community. The issuer is responsible for defining badges, making them available to earners and handling applications for them. Badge issuing can involve participants with various specific roles, such as application assessors, badge creators and administrators.

> **Consumer:** A badge consumer can be a website, organization, or person who accesses publicly shared Open Badges and displays them for badge earners.

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