



Groningen  
Declaration

2023



OCTOBER 16 -19, 2023

**GRONINGEN  
DECLARATION**  
**NETWORK ANNUAL MEETING**

Partners in Digital Mobilization

# Learner Controlled Digital Credentials—Moving Toward Portable, Cryptographically Secure Data

Brandon Muramatsu, MIT  
Gillian Walsh, MIT

We are building an infrastructure for digital academic credentials that can support the education systems of the future.

Read: [Whitepaper \(PDF\)](#) | [Credentials to Employment: The Last Mile \(PDF\)](#)

#### A University-Led Effort

The Digital Credentials Consortium was founded in 2018 by leading universities with expertise in the design of verifiable digital credentials. Together, we are designing an infrastructure for digital credentials of academic achievement.

#### Digital technology has a profound effect on the way we learn.

A wealth of materials is available to us at all times. We can easily connect with other learners, or communicate with our professors. Increasingly, technology is acting as personal guide that can support our individual interests and pathways. But the way we issue and manage academic credentials has not changed that much — and doesn't take advantage of the possibilities of digital technology.



<https://digitalcredentials.mit.edu/>

Founded in 2019

Delft University of Technology\* (Netherlands)

Georgia Institute of Technology\* (USA)

Harvard University\* (USA)

Hasso Plattner Institute, Potsdam\* (Germany)

Massachusetts Institute of Technology\* (USA)

McMaster University\* (Canada)

Tecnológico De Monterrey\* (Mexico)

Technical University of Munich\* (Germany)

University of California, Berkeley\* (USA)

University of California, Irvine\* (USA)

University of Milano-Bicocca\* (Italy)

University of Toronto\* (Canada)

Western Governors University (USA)



# DCC Guiding Principles | Values

**Learners** - Commitment to learner agency and participation

- Learners retain primary control over their credentials

**Issuers** - Commitment to issuer control

- Issuers [e.g., universities] control to whom they issue credentials, the particular achievement that the credential represents, which credential options are available to the learner, the lifecycle of issuing

**Trust** - Commitment to open processes, open standards, and software

- Credentials can be verified without consulting original issuer



# Putting DCC Guiding Principles into Action

- Leading and contributing to the development of **open standards**
  - Co-leading W3C Verifiable Credentials for Education Task Force; participating in development of Open Badges v3; deep technical expertise in key technologies
- Supporting an **open source mobile wallet**
  - Enabling learner control and privacy preserving
  - Enabling sharing of credentials, credentials → employers
- Supporting **open source software** to enable universities to **issue Verifiable Credentials** / Open Badges v3
  - Working with DCC members to deploy VC-based issuing
- Supporting **DCC Members** in **issuing** verifiable digital credentials
- Enabling the development of a **LER Ecosystem**



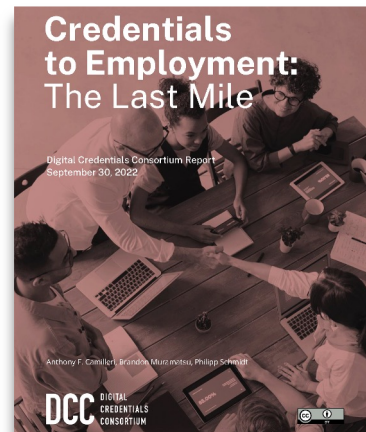
# “Last Mile” Report

Employers want to **match the skills held by applicants to jobs**, BUT there’s a **disconnect**

**Resumes**, paper and PDF, are still the **lingua franca**

Digital credentials *need to contain granular information* about *learning outcomes* or *achievements* to map to skills needed for a job

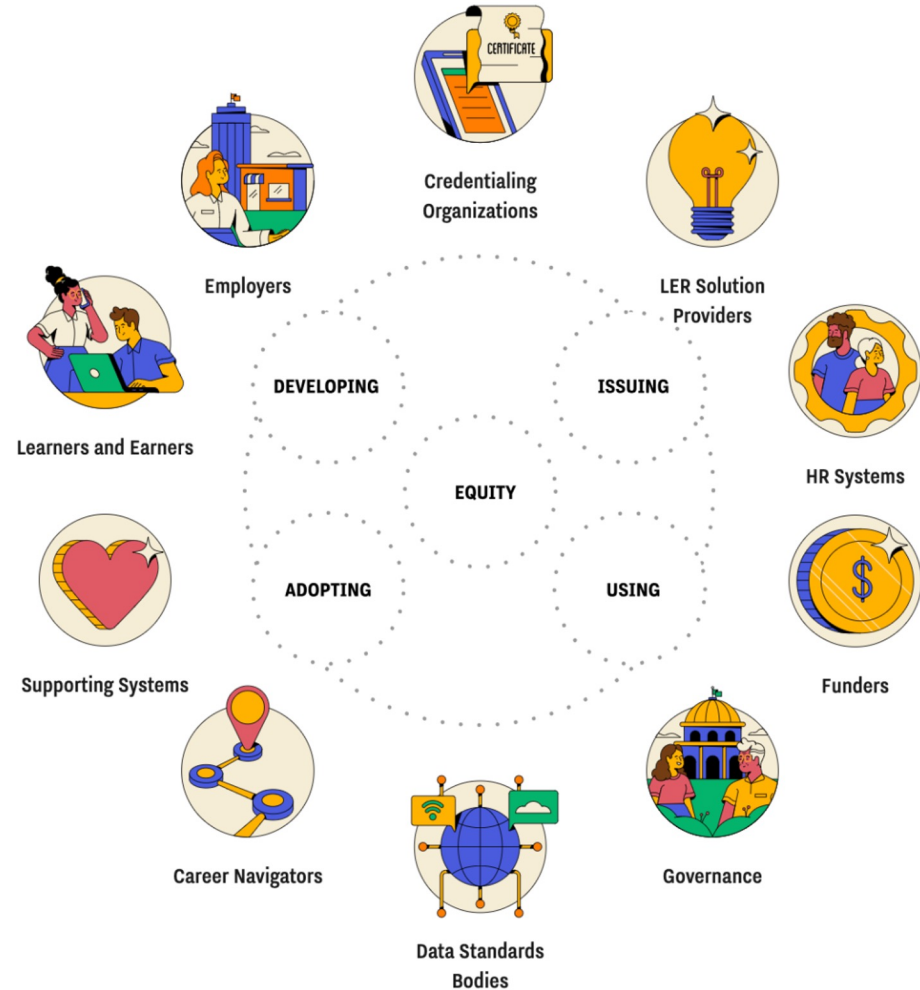
Adoption of Verifiable Credentials is directly related to the way they are **integrated into Human-Resource Management Systems—not currently supported**, won’t be added by vendors unless there is demand



<https://lermap.t3networkhub.org>

# LER Ecosystem

Each stakeholder has a role to play in developing, issuing, using and adopting LERs — all while centering equity as an ongoing driver for the work.



AACRAO

JFFLABS

NATIONAL GOVERNORS ASSOCIATION

SHRM Foundation

U.S. Chamber of Commerce Foundation

Digital Promise

C-BEN | COMPETENCY-BASED EDUCATION NETWORK

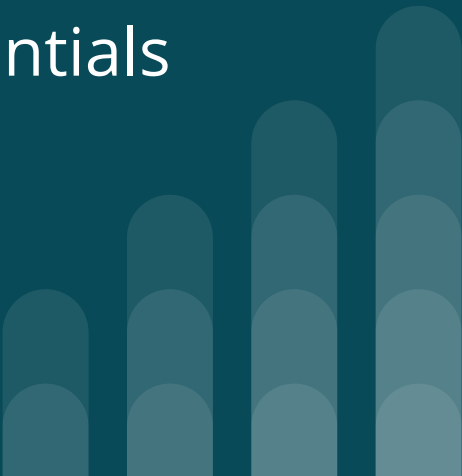
DCC DIGITAL CREDENTIALS CONSORTIUM

National Association of Workforce Boards

T3 INNOVATION NETWORK

## **Verifiable Credentials & DCC Open Source Software:**

Underlying standards and technology to enable  
issuing verifiable digital academic credentials

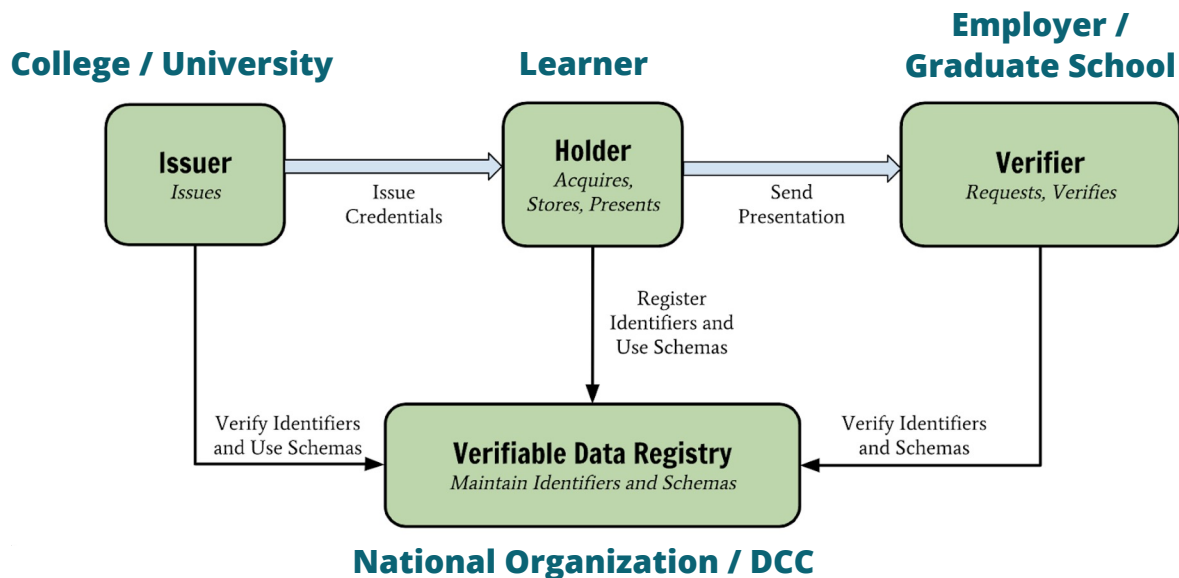




# DCC's Starting Point in Technology—Open Standards

- [W3C Verifiable Credentials Data Model](#)
  - -> 1Edtech Open Badges v3 context
- [W3C VC-API](#)
  - Provides data model and HTTP protocols to issue, verify, present, and manage data used in such an ecosystem
- [CHAPI](#)
  - Protocol allows a digital wallet to receive Verifiable Credentials from an independent third-party issuer - or present Verifiable Credentials to an independent third-party verifier - in a way that establishes trust and preserves privacy
- [Learner Credential Wallet Specification](#)
  - Describes the necessary wallet features and technical requirements enabling individuals to curate and present their learning and employment records to others in an interoperable manner

# Verifiable Credentials Ecosystem



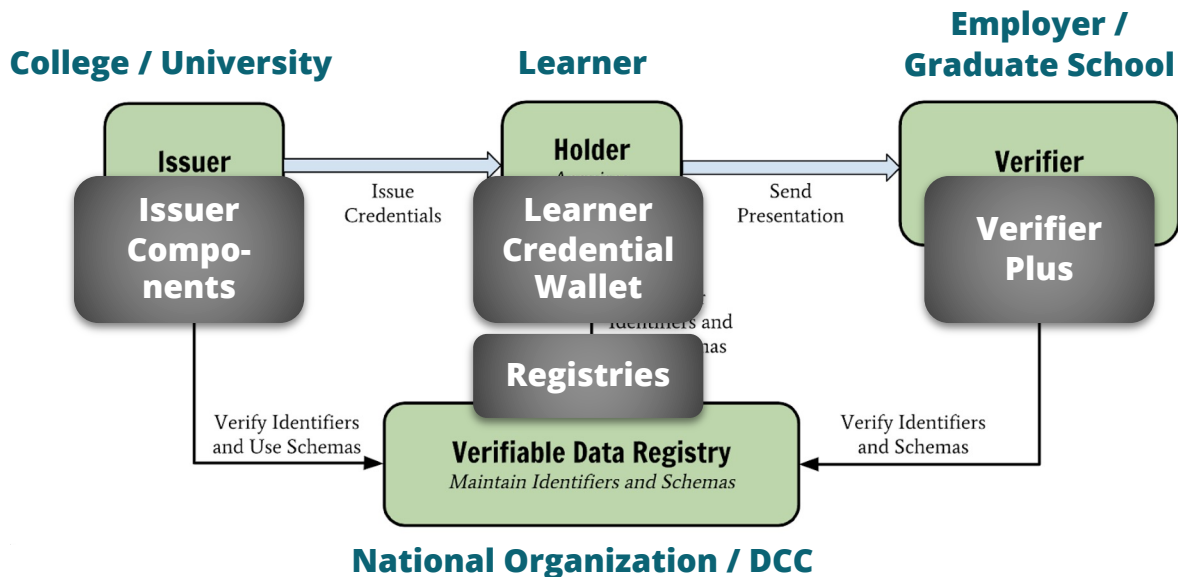
## DCC Credential

Tamper-evident credential where the authorship can be cryptographically verified, that meets the technical and policy specifications adopted by the DCC.

Uses credentials conforming to [W3C Verifiable Credentials 1.1 Data Model](#) (e.g., Open Badges v3)

# Verifiable Credentials Ecosystem

DCC open source software supports all aspects of VC ecosystem



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Uses credentials conforming to [W3C Verifiable Credentials 1.1 Data Model](#) (e.g., Open Badges v3)

**DCC open source software can help you get started!**

# Motivations in Ecosystem Participants





# Verifiable Credentials Provide Opportunities

- Decentralized (Individual) / Centralized (Repository/Union Catalog)
- “Personal Agency” / Issuer- or Service Provider-controlled
- Data (Digital) / Digitalised — data / PDF of Paper
- Doing what’s “right” (better) / doing what’s “easy”
- Some things don’t change
  - Trust; Identity: Issuers and Holders
- Some things probably should change

At the end of the day, it’s not been about the technology—certainly not now with most enabling technologies available. Policy, trust and **“human tendencies”** continue to be primary challenges.



# Holders—Learners

*Need...*

- *Credentials that are verifiable*
- *To be able to use of their choice of “wallet”*
- *To be able to add credentials from multiple issuers*
- *To control their own credentials* *“Interoperability”*
  - *Claim credentials as needed*
  - *Decide with whom they want to share them; share between “wallets”*
  - *Share them in a way of their choosing, ultimately differential disclosure*
  - *Manage their own identity (aka self-sovereignty)*



## Holders—Learners

*Need not allow...*

- *Non-privacy preserving features*
- *A “wallet” to track their use: who are they, what credentials have they received, how / to whom have they shared their credentials*
- *The issuing organization or third-party service provider to track use, beyond fundamental minimums*

# Issuers—Universities and Service Providers

Support  
Learner  
Needs

## Universities Need to:

- *Implement standards based, and trusted digital credentials*
- *Determine who gets what credential*
- *Determine if their credential is issued appropriately and not mis-issued [issuance registry]*
- *Ensure their credential contents and prevent tampering → cryptographically sign*
- *Manage their credential: issue, update / replace, revoke*
- *Credential should be verifiable → cryptographic signature, issuer registry*

## Universities May Want to:

- *Design the credential display*
- *Allow a third party to issue on their behalf [issuing organization]*

## Issuing Organizations May Want to:

- Track recipients claiming their credential
- Track recipients sharing their credential
- *Verify the credential directly*

May  
support  
less  
learner  
control



# Verifiers—Employers/Graduate School

- *Need to be able to “verify” a credential*
  - Has it been tampered with?
  - Is there trust that the issuer is who they expect it to be?
- *May want to verify directly with the issuer*
  - Verifiable Credential standard and DCC open source software don't require this, <https://verifierplus.org>

# DCC Issuing and Learner Credential Wallet





# Example of Claiming a Credential

## Recipient receives an email on mobile phone

College Unbound is working with the Digital Credentials Consortium team at MIT to evaluate a new technology to make it easier for CU degree holders to access and share your degree.

To receive your digital credential in this new format:

1. Visit [lcw.app](https://lcw.app) and install the Learner Credential Wallet for iOS or Android on your mobile phone
2. Open this email on your mobile phone (after installing the app) and [follow this personalized link to retrieve your credential](#) (don't share the link for this credential)!

## 1. Install LCW

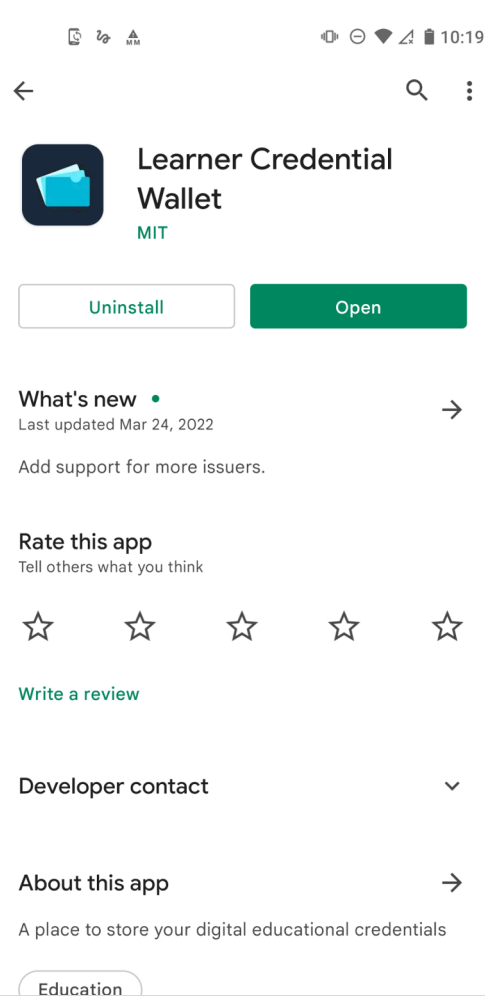
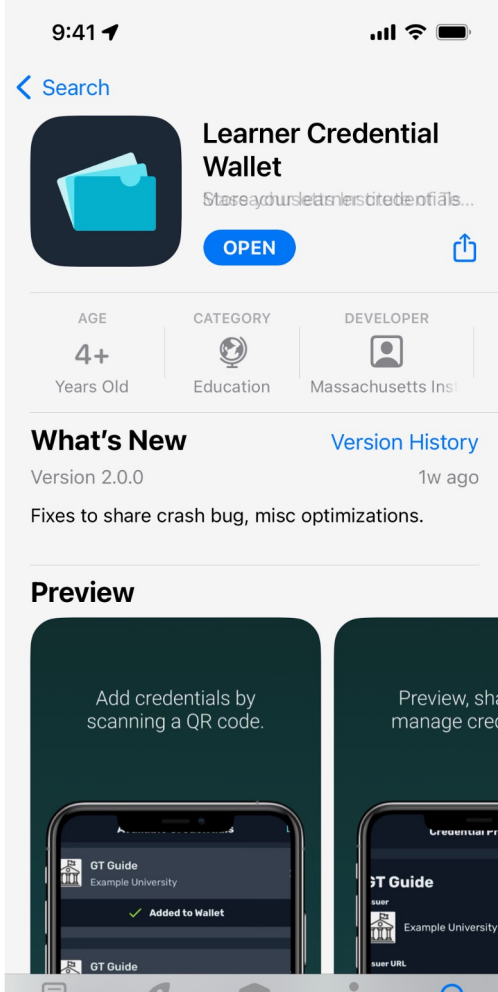


### Learner Credential Wallet

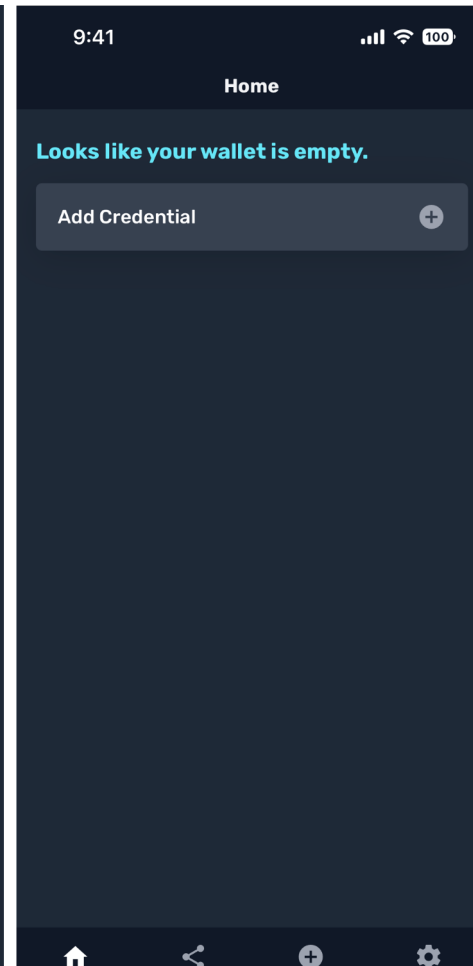
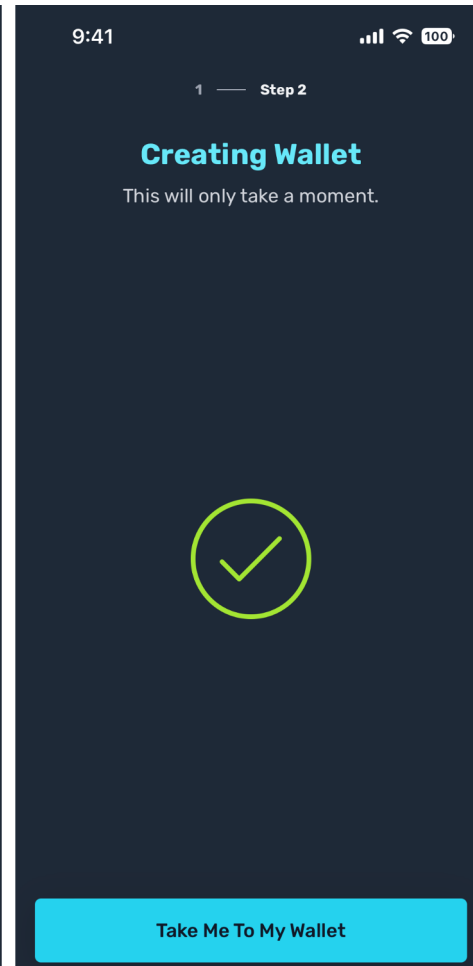
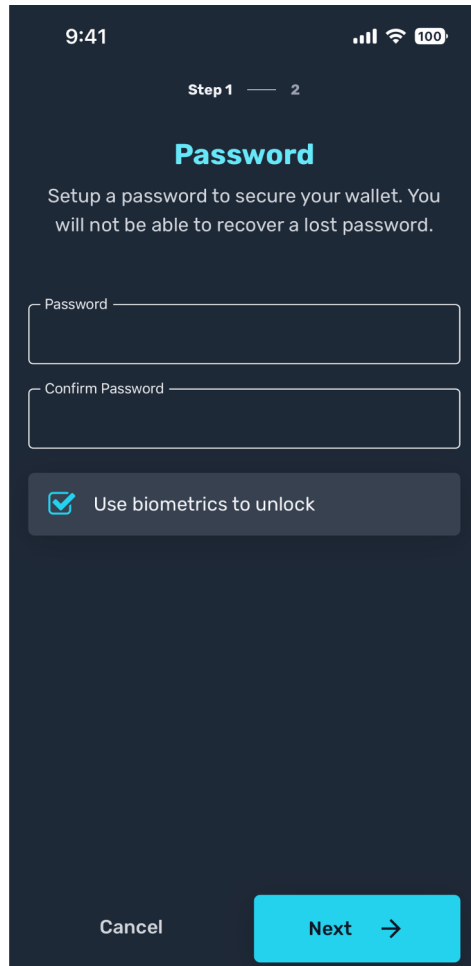
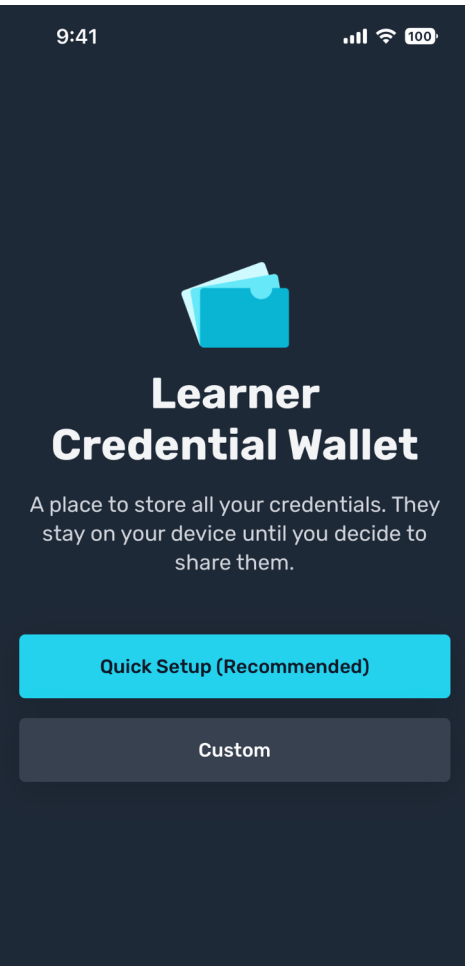
A place to store your learner  
credentials



Learner Credential Wallet is an [open source](#) mobile wallet developed by the [Digital Credentials Consortium](#), a network of leading international universities designing an open infrastructure for academic credentials.



Get Learner Credential Wallet from an App Store



Install and setup Learner Credential Wallet



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## 2. Claim Credential



Brandon

To: Brandon Muramatsu >

4:57 PM

### College Unbound Demo

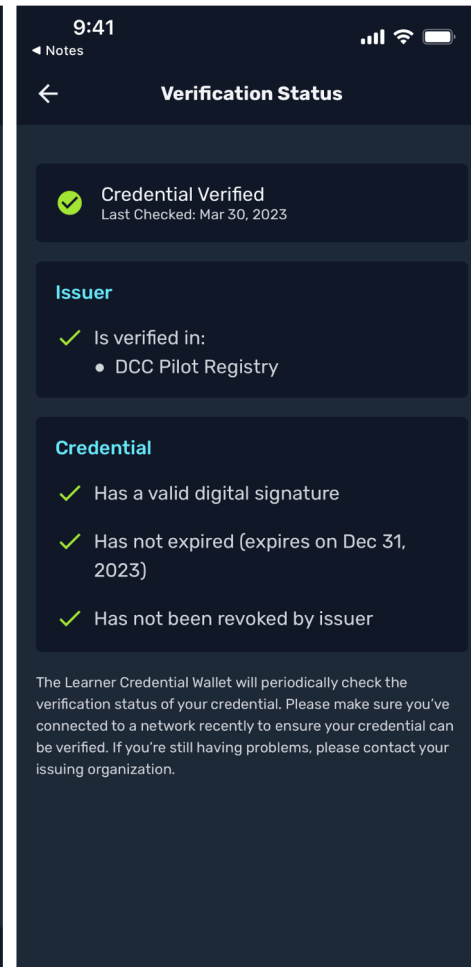
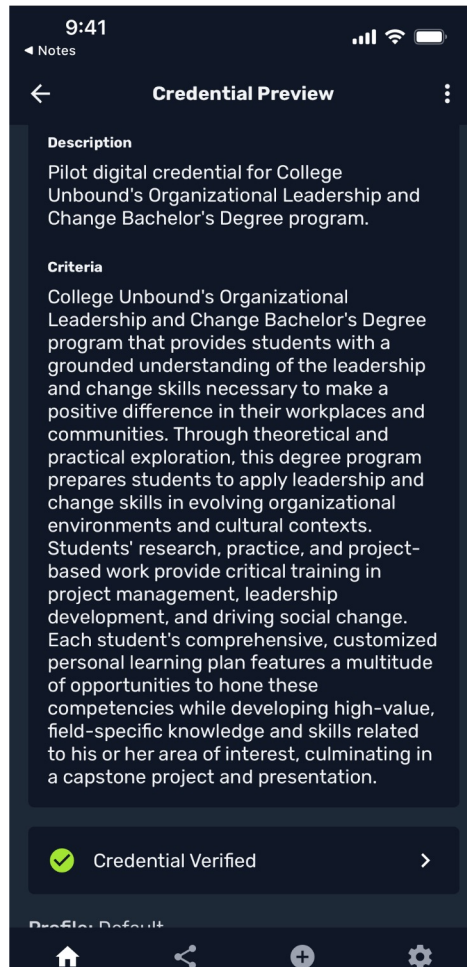
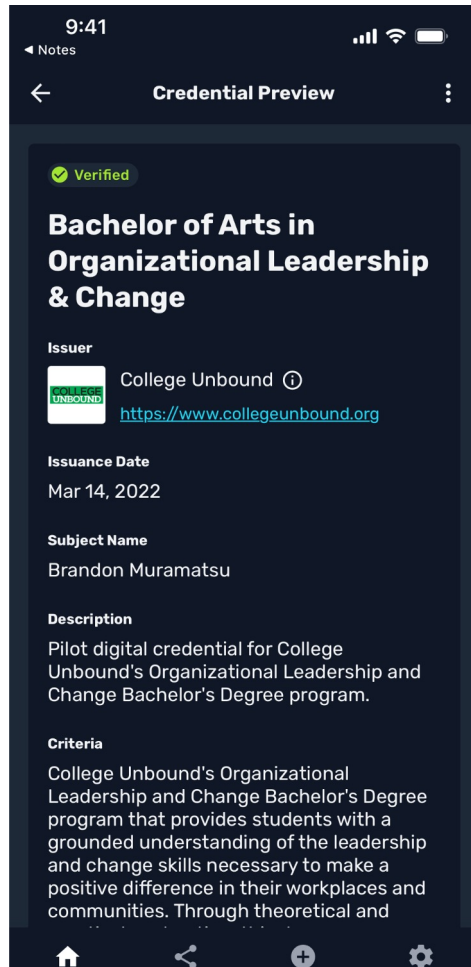
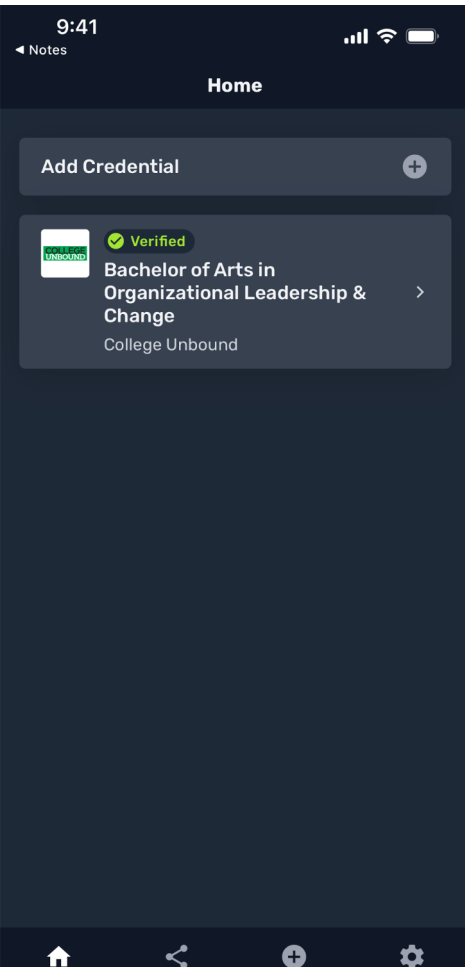
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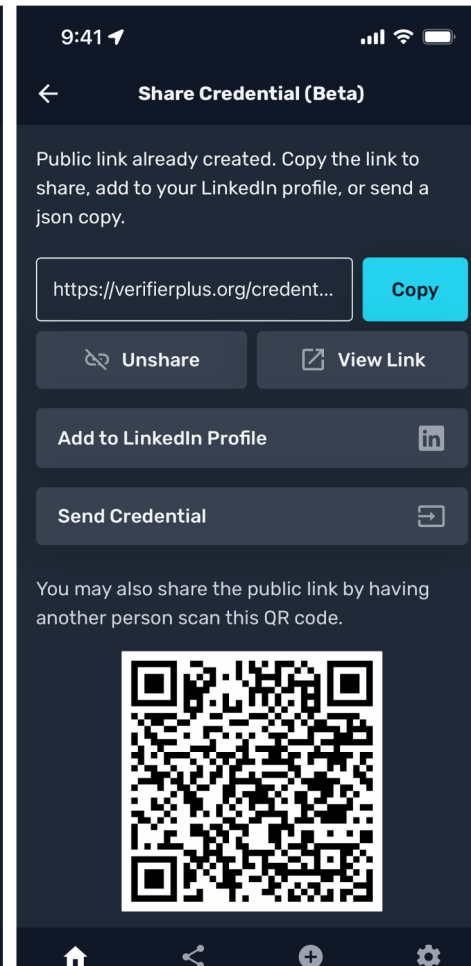
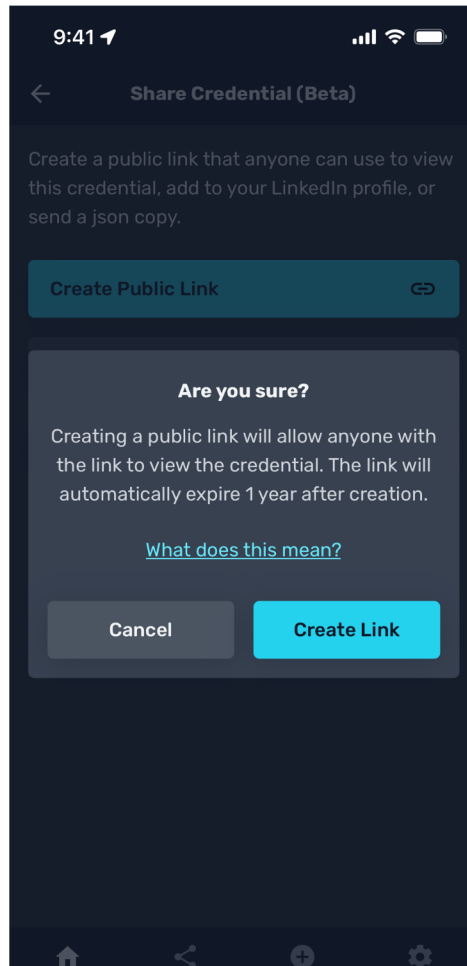
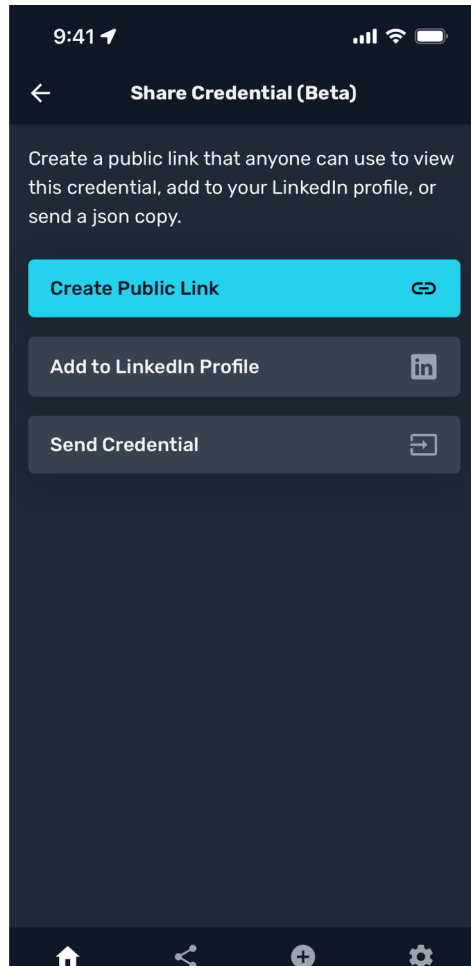
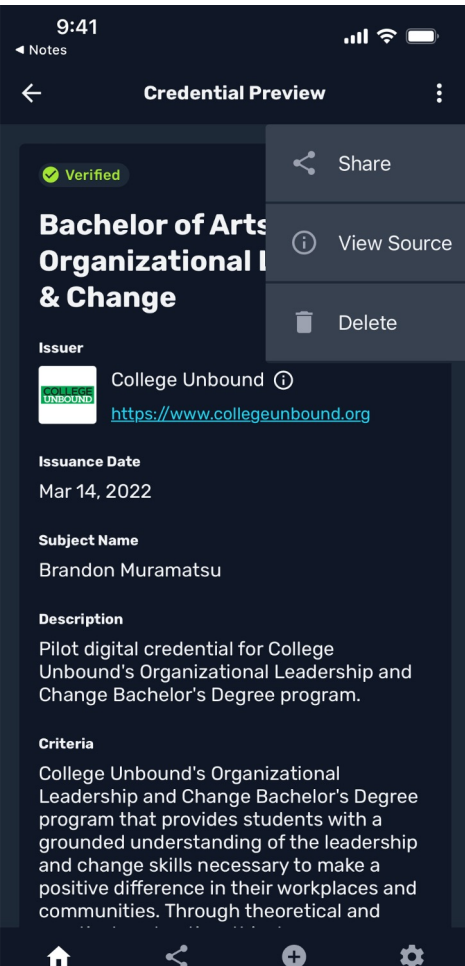
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Please let us know if you have any questions.

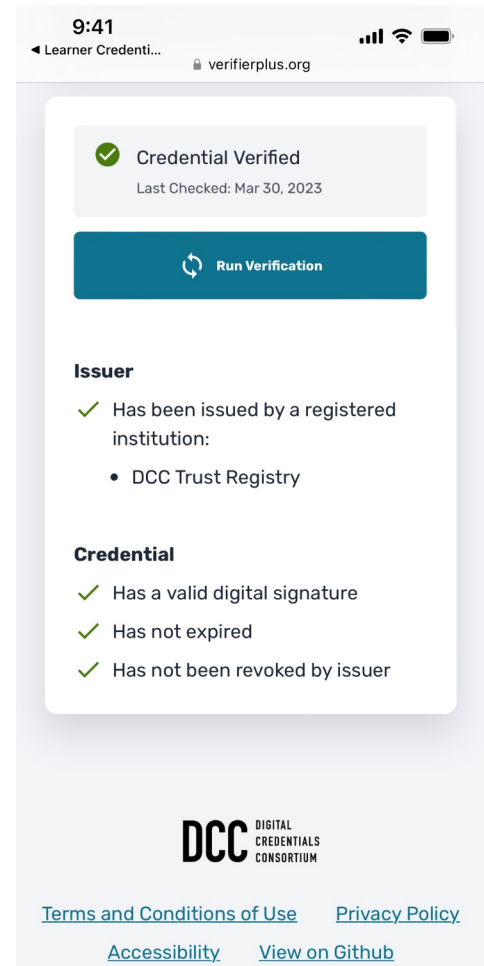
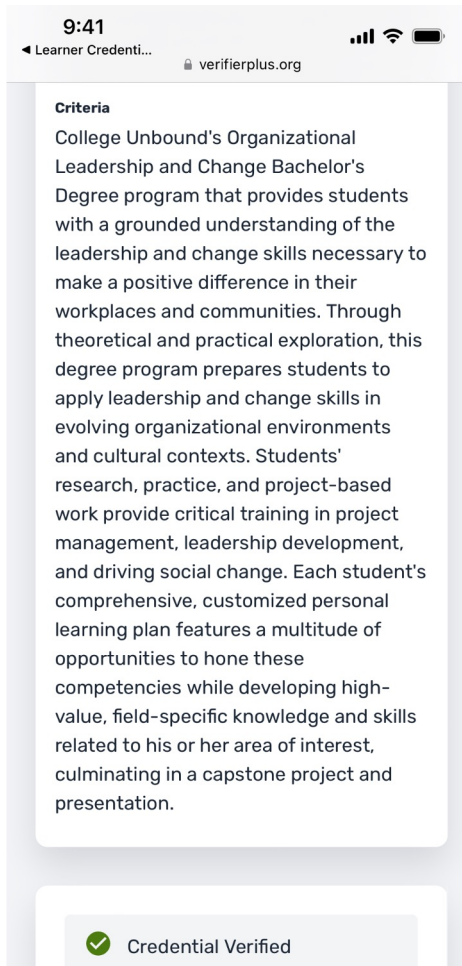
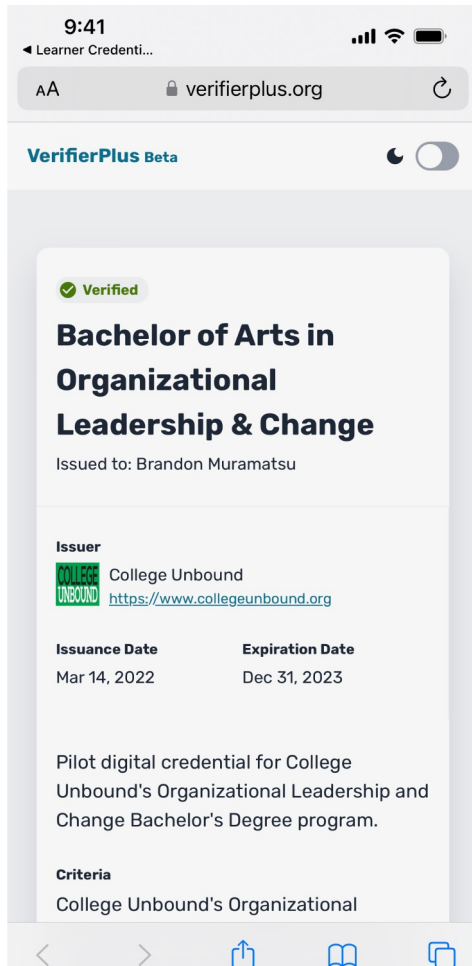
The DCC Team



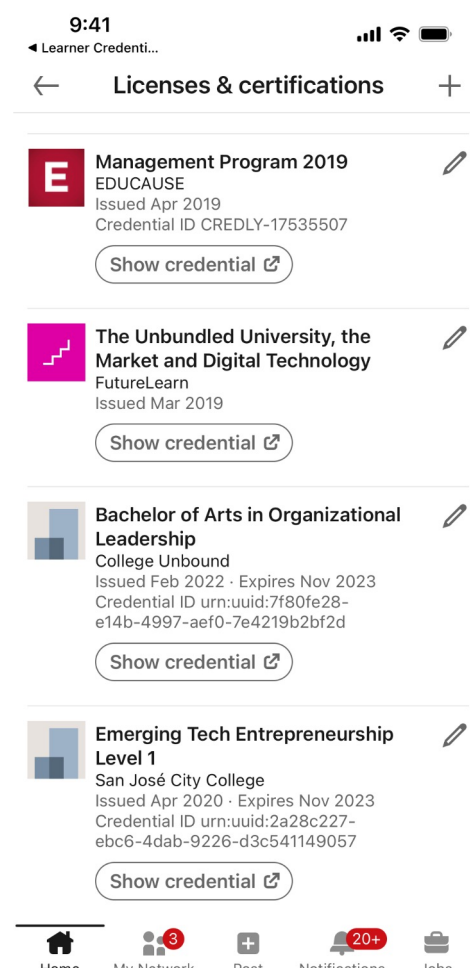
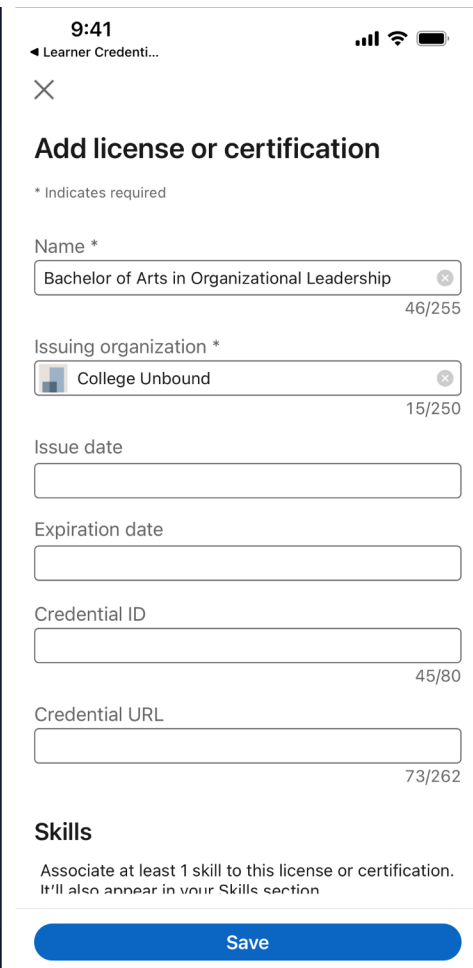
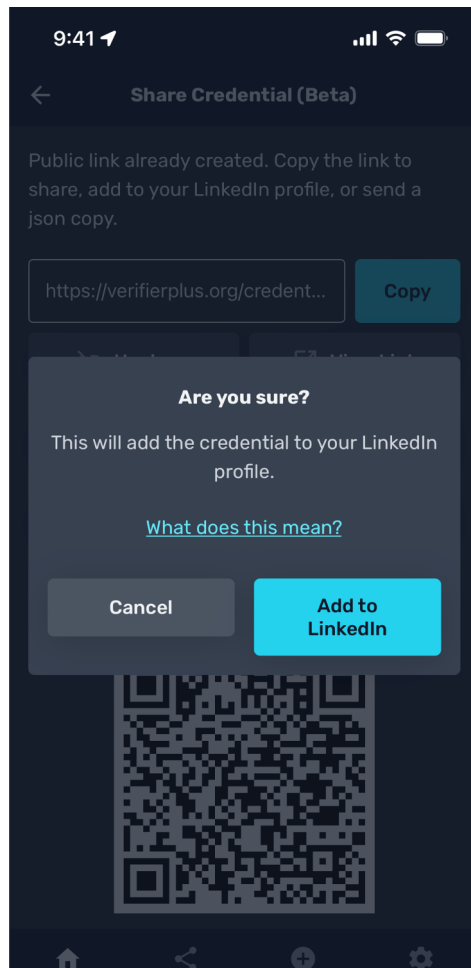
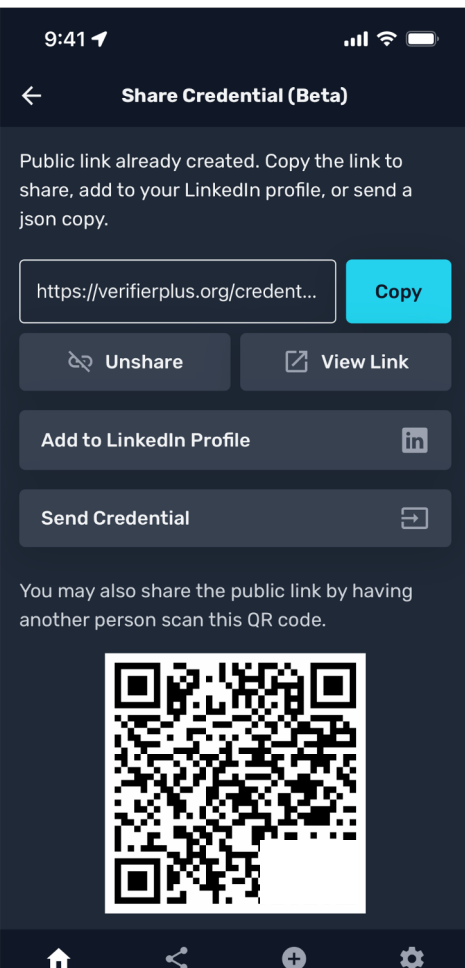
Credential Preview, Verification Status



Share Credential, Create Public Link



View Shared Public Credential, Verification



Add to LinkedIn Profile

# Questions?

Brandon Muramatsu, [mura@mit.edu](mailto:mura@mit.edu)

Higher education or post-graduate institution?  
Interested in membership in DCC? Contact Us!

Open source software to issue/verify verifiable  
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<https://github.com/digitalcredentials>