

# 800149 DirectEd-Student Scholarship Portal

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## What exactly is the change you want to make?

**The following changes were approved in the last change of scope request (January)**

### **Q1: Jan - Mar, 2023**

1. (SSI proposal) Token-based student scholarship portal. On the portal, students can initialize scholarships and request stipend payouts.
2. (SSI proposal) Token-based teacher and examiner portal. On this portal, teachers can issue eligibility tokens to students (which students can use to initialize scholarships), and examiners can issue milestone completion tokens.
3. (SSI proposal) Onboarding Workshop for Kagumo High administrative staff on how to manage a Cardano wallet and how to send out the eligibility tokens to students.

### **Q2: Apr - Jun, 2023**

1. (SSI proposal) Onboarding Workshop for Kotebe University of Education administration staff on how to issue Verifiable Credentials to students.
2. (SSI proposal) SSI Scholarship Portal such that students can share their Verifiable Credential with a Cardano oracle which then creates the appropriate transaction call to the smart contract. Our hope is that we can leverage some Atala PRISM 2.0 SDK or other existing solutions to do this integration.
3. (SSI proposal) SSI Teacher and Examiner portal. This refers to the portal that teachers and examiners use to issue verifiable credentials. Our hope is that we can leverage some Atala PRISM 2.0 SDK or other existing solutions to achieve this integration.

**The following deliverables have been completed as of June 2023**

1. (SSI proposal) Token-based student scholarship portal. On the portal, students can initialize scholarships and request stipend payouts.
2. (SSI proposal) Token-based teacher and examiner portal. On this portal, teachers can issue eligibility tokens to students (which students can use to initialize scholarships), and examiners can issue milestone completion tokens.

## We would like to change the deliverables in terms of time and content to the following

### Removed deliverables

- a. (SSI proposal) Onboarding Workshop for Kagumo High administrative staff on how to manage a Cardano wallet and how to send out the eligibility tokens to students.
- b. (SSI proposal) SSI Teacher portal. This refers to the portal that teachers and examiners use to issue verifiable credentials.
- c. (SSI proposal) SSI Scholarship Portal such that students can share their Verifiable Credential with a Cardano oracle which then creates the appropriate transaction call to the smart contract. Our hope is that we can leverage some Atala PRISM 2.0 SDK or other existing solutions to do this integration.

### Q2: July - Sep, 2023

1. (SSI proposal) SSI Scholarship Portal. This portal should allow any holder of a Atala PRISM 2.0 credential to share it with our website so that we can verify that the student studied at one of our partnering high schools.
2. (SSI proposal) Onboarding Workshop for partner high schools in Ethiopia so that students and administration staff know how to use and issue Verifiable Credentials, respectively.

## Why do you want to make this change?

### General Comments

Our goal was to build a smart contract that could directly take in Verifiable Credentials (henceforth “VC”) as inputs. This had not been researched before. After months of researching alternatives and assessing the current capabilities and limitations of the Cardano tech and the Atala PRISM stacks, we came to the conclusion that protocol-level verification was infeasible, given the current design of the protocol. Though centralized verification by DID service providers such as Proofspace or Snapbrillia was possible, such solutions constitute heavily centralized points of failure.

After discussions with the Charli3 team, it was concluded that a decentralized oracle network-based solution was feasible and the preferred long-term solution to this. However, the Charli3 team reported that building out this capability would take an estimated 2 months of development work. However, even after building out such capabilities, on-demand verification of VCs would likely be relatively costly. When accounting for likely oracle verification costs and the cost to issue VCs, we concluded that the cost outweighs the benefits of issuing verifiable credentials for **every** milestone attainment. There are also limitations with current Atala PRISM

VC services in terms of ability to issue credentials in-bulk, increasing overhead. Moreover, given that DirectEd is currently the only project demanding such a product and DirectEd not having nearly such resources, we rethought the architecture to reduce the need for on-demand verification in the interim.

All of the above meant that we rethought the user flow and design for our use-case. Specifically, we now only use VCs during the initial application stage. This means we assume that the student holds a VC (say, from issued by the ministry of education in Ethiopia) and we only need to verify that the student indeed has passed the national exams, studied at a particular school and attained certain grades. We also want to verify a self-attested VC of the students email and Cardano wallet address. Upon completion of the DirectEd Bootcamp, a student should receive a verifiable credential for this completion.

After this initial verification, we use on-chain tokens to signal milestone attainment. More details about the on-chain document can be found in the following proposal <https://cardano.ideascale.com/c/idea/103811>.

### **Reason why we removed deliverables**

- a. The bootcamp has already commenced and the smart contract was not ready by the time this would have been relevant. Instead, we “manually” asked the school about the grade performance and whether a given student attended their school.
- b. Given the existence of several services that are building out this capability, the marginal benefit of us also building out such a system is very low. There is not only IOHK but also providers such as Proofspace, Snapbrillia and blocktrust that could provide this VC issuance infrastructure.
- c. The cost and complexity of on-demand on-chain (Cardano mainnet) oracle feeds of Verified Credentials lies far beyond the budget or technical capacity of DirectEd. Charli3 reported that they have the technical capability to build out this out, but it would approximately take 2 months of dedicated development. The decentralised automated feed/bridge from Verifiable Credentials is doable but, at the moment, not tractable from a cost vantage.

### **Delayed deliverables**

1. The primary reason the SSI portal was delayed due to a loss of team member with the Atala PRISM/SSI expertise. We had a replacement team member ready to start this work in April but we had to wait for Atala PRISM Pioneers course (technical track) to start, which did not happen until Friday June 2nd. This, of course, meant that we couldn't proceed with the dev work as intended. We did not want to start building based on Atala PRISM 1.4, which is the currently used implementation in the Ministry of Education student credentials system in Ethiopia, but rather Atala PRISM 2.0. We were only given access to the Atala PRISM SDK this past week, which has given us much needed clarity in regards to how can move forward.

2. Can only happen once we have our user flow set up and ready. It is still uncertain whether we can employ this in the Ethiopia pilot (end of July/early August) but we are discussing using Blocktrust's recently completed [platform](#) for this.

## **What is the impact of this change on your ability to complete the project as set out in your Ideascale proposal?**

The original vision: a scholarship application portal that verifies Atala PRISM (now 2.0) credentials is still intact. This change constitutes a change in architecture and is a reflection of the reality of the state of the technology as it stands today. The aspect of conditional transfer of funds upon satisfactory milestone completion is also intact but the “container” of milestone attainment was shifted to tokens (NFTs) on Cardano rather than Verifiable Credentials. See closeout [video](#) from dApps and integrations.