

LearnT - Specification for a decentralized learning economy

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Abstract

A decentralised learning economy in one in which a teacher is economically incentivized only to *drive learning outcomes*. The market runs with a native protocol token (also called “LearnT”), which teachers earn by floating courses. Conversely, recruiters spend LearnT for being able to hire graduates of these courses. Teachers compete to attract best students and sizeable rewards from recruiters, thus freeing them off the burden of charging students.

This work introduces

- NFT-Ls which are non-transferable tokens of proof of mastery. This is an extension of ERC-721 and EIP-1238, available on the Ethereum main-chain. We will be specifying the open standard for these decentralize certificates.
- Verifiable and Auditable proofs of learning. The complete set of events leading to the learning outcomes are publicly stored and accessible on IPFS. Every NFT-L references this *trail of learning*
- A new format of teaching and learning, and economic incentive structure for a fully functional end-to-end learning market.
- Learn Coins is the underlying currency that is used to vote on what and how the future of learning shapes. We will touch upon the uses of this ERC-20 token multiple times in this paper.

These specifications are being implemented on an app called Questbook - a learning app for professionals available across devices.

1 Introduction

Today,

- The only way as of today to incentivize the teacher is to extract a fees from the learner. This does not give any incentive for the teacher to improve learning outcomes. There is no incentive reducing the number of students - rather forces them to increase the class size, earn more money, and deliver *lesser* learning outcomes.

- The current economic models completely leave out a crucial stakeholder in the learning process - the companies, organizations and individuals who recruit these learners. These are people usually with high paying capacity, most vested in skilled individuals - but yet not part of the economy.
- The most popular ways of reporting that an individual possesses a skill is either through a certificate issued by a certification programme or, worse, by self-reporting them on social media. There are little or no ways to verify or audit these claims.

Here we highlight some of the problems in the traditional mode of skill development and assessment.

1.1 Problems in - Incentives for teachers

Most teachers are teaching on platforms like Teachable, Kajabi and Udemy - in the hope that people will pay them for what they are teaching. This means that the teacher cares only about the number of people coming into the course. The quality of course delivery and making an impact on the learners' lives seems to be a distant secondary metric. Teaching is no longer about learning outcomes. It's turned into a popularity contest of attracting the largest number of enrolments.

Online education marketplaces are centralised and reward teachers for enrolments. We think this is fundamentally flawed and incentive structures are designed for a poor learning experience. Using decentralised systems we can create a far better incentive structure that is directly tied to learning outcomes. With LearnT, teachers will earn more without charging students - through small classes and ensuring learning outcomes.

1.2 Problems in - Incentives for learners

Many learners get tricked into enrolling for courses without knowing how their lives will be transformed because of this course. Learners, consciously or subconsciously, choose the best marketed course as ones to take up. When they do enroll on an online course they do not have skin in the game. Dropoffs are rampant and there is no incentive to actually learning from the course.

With Questbook, learning is always free. Learners learn along with a small cohort of motivated peers interested in the same thing, with the guidance of an expert teacher. We will be introducing the incentive structures that drive away non-serious learners.

1.3 Problems in - Certification Verifiability

1.3.1 Contacting the issuing authority

The only way to check if a certificate has not been tampered with or created fraudulently, one must contact the claimed issuing authority to verify if they actually issued the certificate. This process is usually non-automatable and

cumbersome that most people end up giving the benefit of doubt to the applicant.

We will be proposing an on-chain certificate that will be verifiable and auditable in real-time.

1.3.2 No history

Most certification programs happen behind closed doors. If an individual produces a certificate it is impossible to know how the certificate was earned. There are probably no records, or even if they are - they aren't publicly viewable. Now that most of the learning is now happening online over chat platforms like Slack, Discord, Telegram and Zoom, it is possible to have a record of the *trail of learning*. In the solution we will be proposing, every skill certificate will be auditable using publicly available information.

2 Solution and Specifications

Questbook is a *specification by implementation* of the proposed learning standards.

2.1 New format of learning - Quests

We've traditionally been used to only a big-bang learning approach either in the form of years long or months long courses. On Questbook, every course is to be broken down into small bite-sized courses called Quests that are both atomic and independent. A Quest consists of

- **A Questmaster** who will run the Quest
- **A Questroom** where the participants can chat with each other and the Questmaster. At any point in time a Quest room can only have a fixed number of participants - thereby, limiting the number of people who can participate in the Quest at any point of time.
- **Quest material** is what the participants must read/watch before participating in the Quest room. These could be videos, blogs or podcasts that are required reading to complete a task in the Quest.
- **Quest task** is what the participants must apply the learnings on. This is what the Questmaster will evaluate the participant on. E.g. *Write a for loops in Python to draw a triangle*
- **A proof of learning** at the end of the Quest. A Questmaster approves a participant when they have mastered the material shared in the Quest. Once approved a non-fungible non-transferable token (certificate) is credited to the participant's wallet

2.2 New Certification - NFT-L

We propose NFT-Ls as an **open global standard** in issuing certificates against attaining a skill. This will be awarded upon completion of a particular Quest. These NFT-Ls consist of the following information.

2.2.1 Public Key

Every NFT-L (non-fungible token of learning), will be issued on the main Ethereum chain and queryable by the publickey to get further details about the issuance.

2.2.2 Issued By

This is the public key of the Questmaster who ran the Quest. Who ran the Quest is a very important signal in who issued the Quest. We will see later that the incentives of the Questmaster are tightly tied to the quality of learning accrued by participants in the Quest.

2.2.3 Issued To

The public key to whom the NFT-L has been issued. This is, unlike regular NFTs, **non-transferable**.

2.2.4 Quest information

The Quest that this NFT-L was issued as a part of. Each Questmaster could potentially have multiple Quests running.

2.2.5 Time to complete

How long it took for the participant to complete the Quest. Though not fool-proof, someone learning something faster than the others assuming they all started at a level ground is a valid signal in the quality of learning of an individual.

2.2.6 Metadata

- Date of issuance
- NFT-L Merkel root
- Signature of issuing platform (e.g. Questbook)

3 Teaching Process

3.1 Gating the quality of Quests

Only high quality Quests will be allowed on the platform. A high quality Quest is one that drives valuable learning outcomes. Individuals and Companies looking to hire talent can vote on what gets taught on the platform by staking Learn Coins on individual Quests.

The top n Quests every day will be allowed to start. Any Quest that is allowed to start, credits the staked Learn Coins to the creator.

3.2 Cohort size

Questbook recommends Questmasters start their first Quest with a small group of four participants. Gradually increasing the cohort size with experience. Research shows that smaller class sizes drive better learning outcomes.

3.3 Gating participants

All the users who have shown interest in participating in the Quest are listed for the Questmaster to approve entry to the Quest. They are prioritized based on the following two signals.

3.3.1 Staking an NFT-L

The Questmaster can optionally define a pre-requisite NFT-L for every Quest. That means, people who have completed the other Quest will get an advantage - by getting an automated entry to the Quest. This is also a way to tell the participants as to what knowledge is required to participate in this Quest to get the maximum benefits.

3.3.2 Staking Learn Coins

If there aren't enough applicants who already own a pre-requisite NFT-L, the other participants are sorted by how many Learn Coins they are willing to stake to complete the Quest. We will see later that more the participant stakes, more they are invested in learning what is being shared in the Quest.

3.4 Time limit

The Questmaster also sets their availability by setting a tentative duration to the Quest. The participants must complete the Quest before the specified time. Once the Quest is ended by the Questmaster, the participants can no longer get an NFT-L in this version of the Quest. Again, this is to be respectful of the experts running these Quests.

3.5 Quest Edition

The Questmaster can choose to run multiple editions one after another of the same Quest. Each edition opens up the voting mechanism again, where institutes and individuals pay the Questmaster for the new edition. This is how the Questmaster primarily earns on this platform.

4 Learning Process

4.1 Choosing a Quest

There are various signals that will be made public to the users who are browsing through all the available Quests. We leave it to the open market dynamics to pick the winning Quests. The following are public information for the user to make an informed choice

- **Questmaster Reputation** : Reputation of the Questmaster is a function of how many participants participated in all their Quests aggregated and the number of NFT-Ls they've issued. Indicating the quality of the Questmaster.
- **Quest edition** : How many times has this Quest been run before. More it has been run, more it has been battle tested.
- **Votes** : Number of Learn Coins paid to Questmaster to run this Quest - thereby suggesting the market value of the skill taught in this Quest. Resets to zero at every edition of the Quest.
- **Average time to complete Quest** : Those who have been awarded an NFT-L in an earlier edition of this Quest, how long did it take them to get it. Indication of time commitment required from the learner.
- **Last issued NFT-L** : When was the last NFT-L issued in any earlier or current edition of this Quest. This shows how active the Quest is right now.
- **Pre-requisite NFT-L** : An NFT-L that is suggested pre-requisite to attend this Quest. Suggests what knowledge is required to make the most off of this Quest.

4.2 Learning Material

The learning material is public and anyone can view it without participating in the Quest. These are typically links, videos or PDFs. The user can see if they want to master the material by participating in the Quest. Allowing learners to consume instructional material outside class, and using discussions to answer questions and drive curiosity has proven better results.

Learning Material is only a small part of the learning process. Lot of people are used to assimilating information but never applying it. Anyone is free to open these learning material. The ones who want to master can choose to participate in the Quest by requesting an entry to the Quest. Questbook focuses on Mastery.

4.3 Requesting Entry

All the Quests are gated and number of participants limited. To participate, one must produce one of :

4.3.1 A pre-requisite NFT-L

If the learner owns the pre-requisite NFT-L they are given automatic entry to the Quest on a first come first serve basis. The NFT-L is automatically staked in the Quest.

4.3.2 Staking Learn Coins

If the learner doesn't have the pre-requisite NFT-L and wants to participate, they can stake some Learn Coins.

4.4 Completing a Quest

4.4.1 Public Chat

The Quest can be run in any format the Questmaster deems appropriate, by coordinating with the participants directly over a public chat. Questbook recommends the Questmasters conduct all the communications in the public. Questbook automatically archives all the chats in a public repository. This public repository can be accessed whenever someone wants to audit a particular NFT-L.

4.4.2 Request for NFT-L

The issuance of the NFT-L is initiated by the learner. The learner uploads a *Request for NFT-L* as a special attachment in the Questroom chat.

4.4.3 Approval or Rejection of the NFT-L

The Questmaster can then look at the *Request for NFT-L* and either accept it or reject it along with a voice/text that stays as an authentic commentary with the NFT-L forever, if approved. If rejected, the chat continues and the learner can attempt a request any number of times.

4.4.4 Recovering the Stake

If the NFT-L is issued, the participants gets back, along with the new NFT-L, the staked NFT-L or the staked Learn Coins.

If the participant is not able to get an NFT-L before the Quest ends, the staked NFT-L is burnt and the staked Learn Coins goes into a community pool.

5 Voting process

Voting for new Quests and re-runs of existing Quests is a core pillar of this economy. Voting happens by staking Learn Coins on a particular Quest. There are few reasons for the voting

- **Determining what needs to be taught on the platform, and in the world.**
- Shows market demand for the learning outcomes - recruiters could vote to get access to potential hires.
- This is also how the Questmaster is incentivized monetarily. We don't want to charge the learners for learning.

6 Uses of NFT-L

It is uncertain as to where all NFT-Ls will be used, but it is clear that the application will be as wide, if not wider, as the expanse of certificates itself.

6.1 Job Opportunities

The institutions who had paid the Questmaster for a particular Quest, could have had the motive of building skills that they want to hire. Producing such an NFT-L to such institutes will be a great optimization in their hiring process.

6.2 Grants and Scholarships

Questbook will be working closely with institutions and organizations to give out grants like Gitcoin Grants or Scholarships from governments or other NGOs.

7 Uses of a Staking

7.1 Access to graduates

The more you stake in a Quest, the sooner you know about the *graduates* of that Quest. The more the difference in your stake as against the next in line, the more the time difference between when you get access to the graduates as against the next.

7.2 Recommending learners

Having stake in the Quest, companies can recommend few of their employees to undergo the Quest to upskill themselves.

7.3 Access to audit

When the Quest is on-going, the chat history is not public. It is made public only when the Quest has ended. The users who have staked Learn Coins on a Quest, get access to chat history before the Quest has ended. They get access to chat history as a function of Learn Coins staked.

7.4 Creator Benefits

Creator may provide various advantages to the staking companies. Or, apps could be built on top of this layer. Some of the examples include

- Priority inbox
- *Guest Lectures* in the Quest
- Participation in Quest design
- Community recommended add-ons.

8 Initial incentivization Model

To bootstrap the initial liquidity on the platform we will be incentivizing the early customers with Learn Coins - based on a definitive logic. First 3M Learn Coins will be distributed as a part of the Initial incentivization plan.

8.1 Questmasters initial Incentive Plan

Total pool = 2M Learn Coins. The factors that define the number of Learn Coins a Questmaster L gets on dropping the first Quest :

- Sum of **Number of Learn Coins in votes** across all Quests by that Questmaster, v
- **Authority score** on other social media, s
- **Editors' score** based on who will be most useful to the platform as decided by a jury, E

TODO

$S = 0.002$

8.2 Learners Initial Incentive Plan

Total Pool = 1M Learn Coins. The factors that define number of coins a learner gets upon completion of their first Quest L

- **Authority score** on other social media, s
- **Time to acceptance** into the first applied Quest, t_{accept} (number of hours)
- **Time to complete Quest**, $t_{complete}$ (number of hours)
- **Editor's score** based on who will be most useful to the platform as decided by a jury, E

TODO

8.3 Ongoing incentivization

Every month 100,000 Learn Coins will be distributed to the top 5% of the Questmasters using the following weighting w

8.3.1 Questmaster

- Number of NFT-Ls issued ever by this Questmaster, N
- Number of Learn Coins paid as vote in the last completed Quest v
- Number of NFT-Ls issued by this Questmaster staked and recovered ever R
- Number of Learn Coins staked in last ended Quest σ
- Number of months since the ending of the last Quest t

Equation for distributing Learn Coins to Questmasters :

$$w = v * e * \frac{R}{N} * \frac{t^{0.9}}{e^t}$$

8.3.2 Learner

Every month 100,000 Learn Coins will be distributed to the top 20% of the Learners using the following weighting w

- NFT-Ls earned in Quest q
- Total Learn Coins used to vote on the Quest σ_q
- Total NFT-Ls issued so far in the Quest N_q

$$w = \sum_q \frac{\sigma_q}{N_q}$$

9 Governance and Future Work

A core fundamental of Questbook is to make learning free and accessible to everyone. We think it is crucial for such a system to operate as a true decentralized autonomous organization. A decentralized learning economy would be one in which the economic incentives are directly aligned with the learning outcomes on the platform. Though Questbook is the first to implement the specifications in this paper, it is crucial that Questbook is no longer a centralized entity deciding what gets taught and learnt in the world.

To make it truly decentralized the following will be crucial.

9.1 Open Sourced

Questbook will be completely open sourced and anyone is free to run their own instance of Questbook and the LearnT protocol. Questbook itself will also be exposing APIs that can be used to build a thriving market of plugins on top of the platform itself, without having to fork Questbook.

9.2 Proof-of-stake

Questbook will transition into a Proof-of-stake consensus model for governance by staking Learn Coins. Here are a few examples of governance decisions

- API specifications
- Incentive model updates
- Core product updates and merging pull requests
- Feed ranking algorithm

Questbook is fully committed to building the world's first *University DAO*. We fundamentally believe education should not be centralized and authoritarian.