Huichen Chou, Mizuha Marumoto, Patrick Ocheja & Agustina Yohena
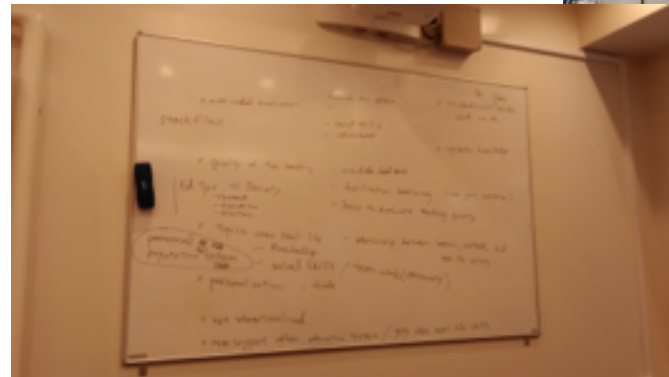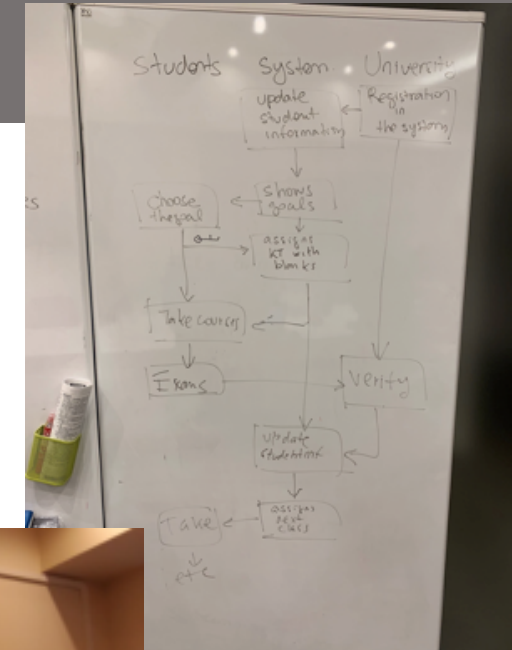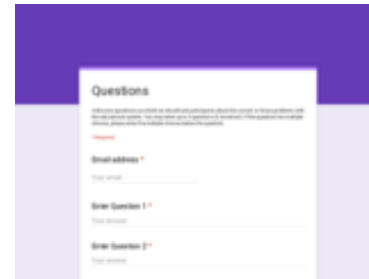
Faculty: Prof. Toru Ishida, Assoc. Prof. Donghui Lin & Prof. Hiroaki Ogata

Distributed Scoring System on Blockchain

FBL/PBL

Content

- Background
- Problem solving process
- Problem framing
- System design / prototype
- Business model
- Conclusion

Background

- A blockchain
  - a continuously growing list of records which are linked and secured using cryptography.
  - inherently resistant to modification of the data.
  - potentially suitable for the sharing a variety of records to ensure traceability without any centralized control.

- This FBL/PBL prototypes a new social system by using blockchain technologies.
  - Education system problem.
  - system design and business model/ value chain

Problem solving process

Inspiration: observation and learning from the real world:

What is the problem of current education system? (international responses)

survey

literature review
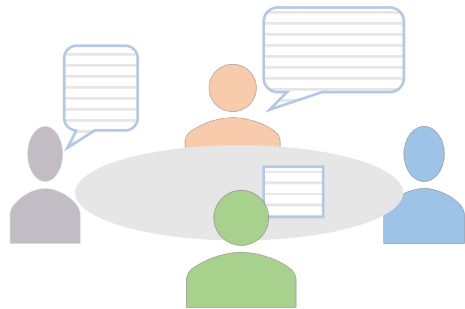
18 online questionnaires
7 face to face interviews
students only

Our idea + others idea

- More personalized education
- Low quality of classes
- learning focus in exams
- low income study opportunity gap
- recruitment system
- method of English education
- recognizing vocational education
- .....

a lot of problems!

Ideation: analysis the finding and choose a problem to provide the solution

We tried "quick & dirty" approach to solve several problems

Multi-modal evaluation
- focus on exam. Too much
- cover social skills
- volunteer ability

Quality of the teach
-immediate feedback
-facilitation learning (not just learning)
-how to evaluation teaching quality

Topics cover real life
- relationship between learning content and real life utility

University:
Passion
Motivation /
creation

Business models
- advertisement
- organization to be evaluator,
- match user and company
- company can put in the system content to ask to review

Personalize
- divide the class

Not internationalized

More support after high school education/ gap year to learn relationships

Make ideas
What is new, what is important, why this idea, what would happen if we have this model.
Clear target of the system : who will use it.
How to evaluate this idea…
"interesting" and Blockchain can provide the best solution.

Propose distributed scoring system to assesses people capability beyond academic skills.

Current education system has too much emphasis on academic skills

Distributed evaluators : teacher, peers, volunteer team leaders, banks...

- Related work
  - skillcoin.foundation: personnel matching service using skill verification functionality
  - Schmidt et. al also proposed to incorporate online peer based assessments into learning achievement.
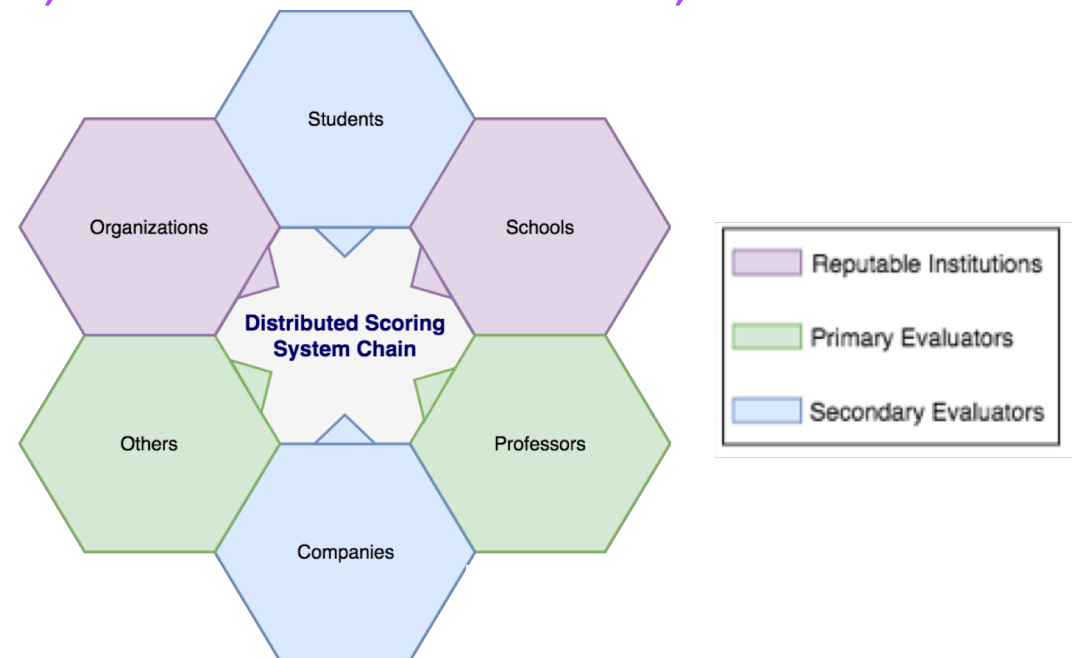
Source: Schmidt, Jan Philipp, Christine Geith, Stian Håklev, and Joel Thierstein. "Peer-to-peer recognition of learning in open education." The International Review of Research in Open and Distributed Learning 10, no. 5 (2009).
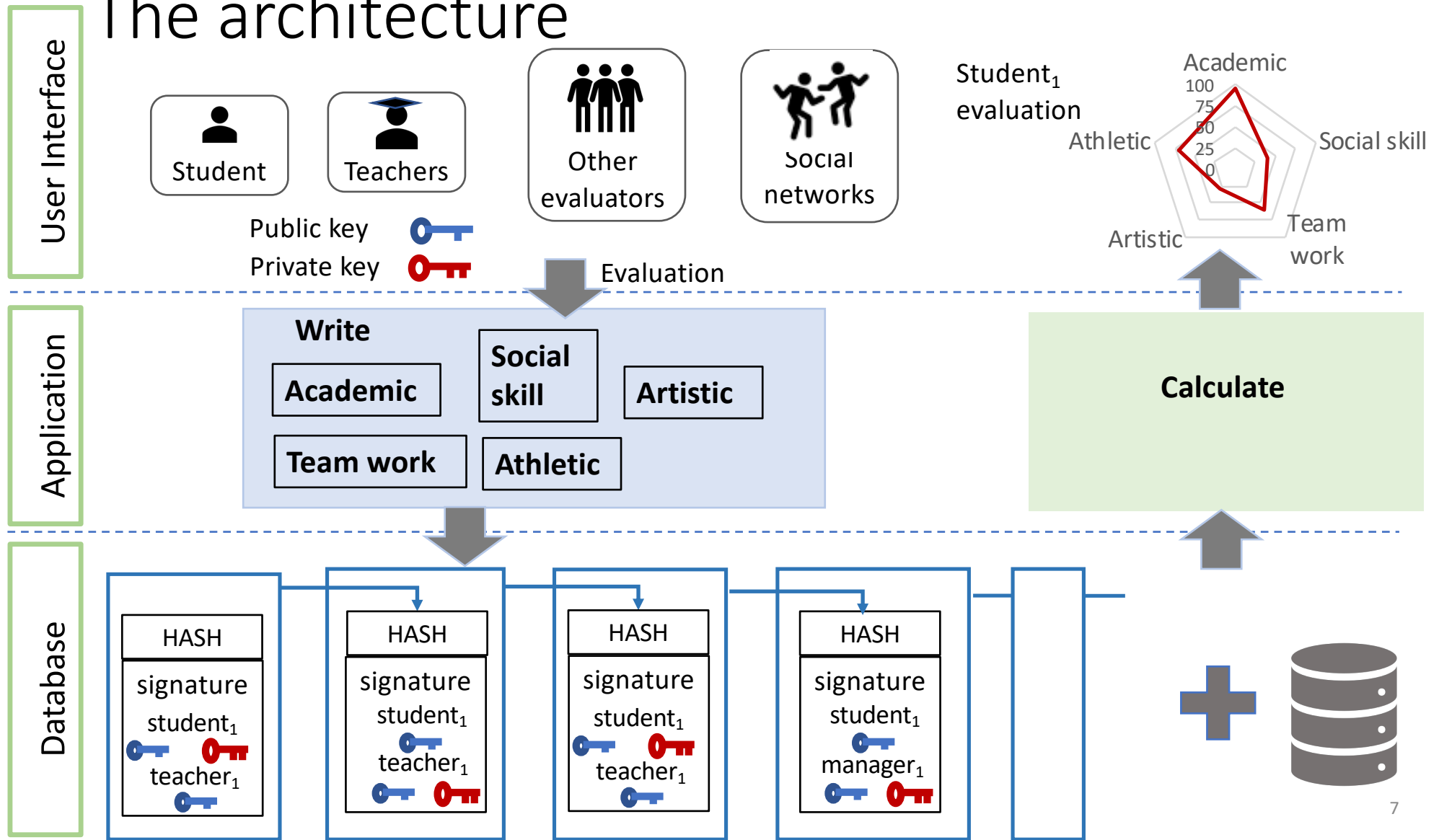
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The framework

- Peers evaluate one another.
- Evaluation can occur at different places or on different tasks.
- Evaluation methods can be different.
- Evaluations provided can be verified.
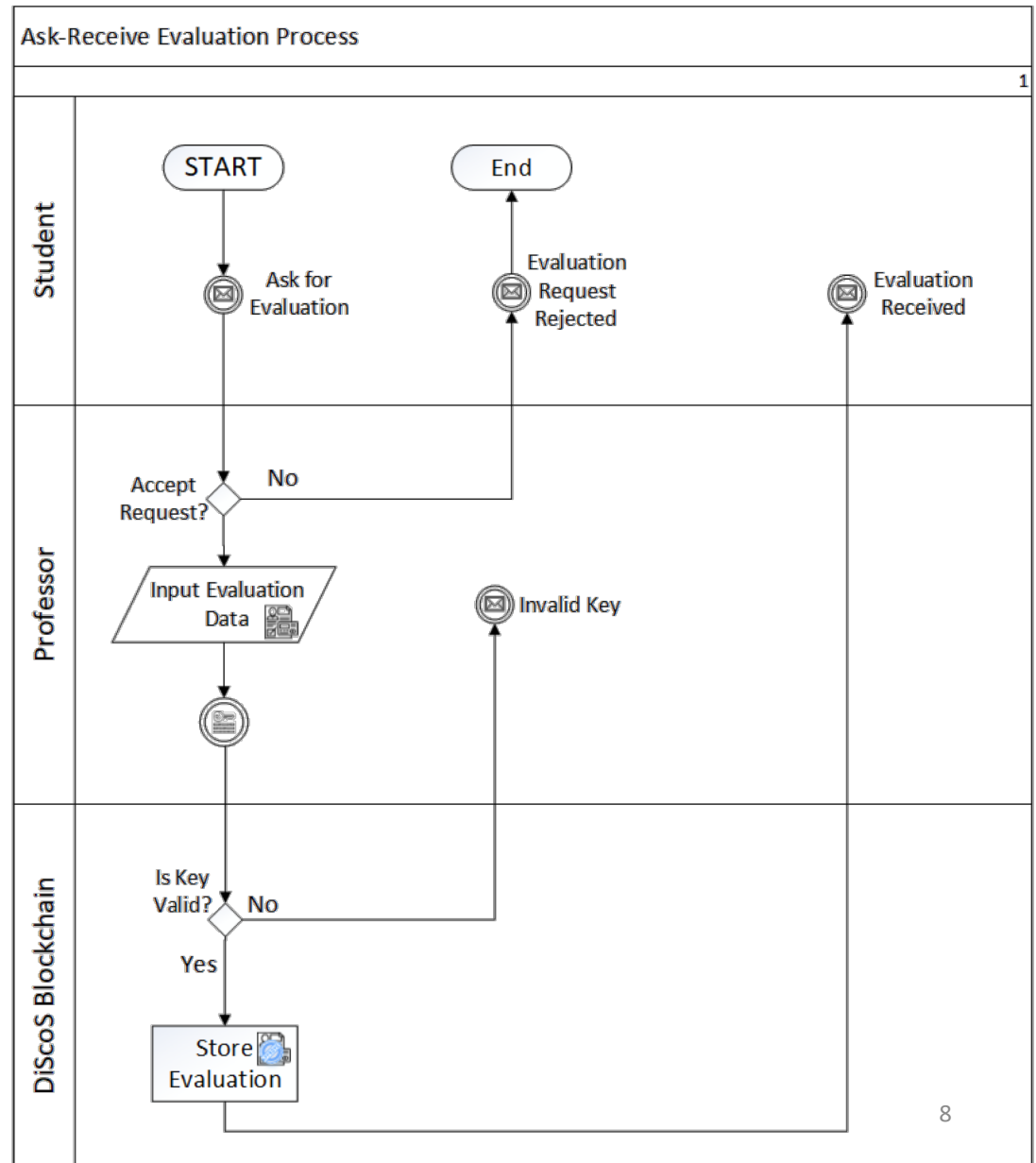- A collection of evaluations can be used to give a reputation score.
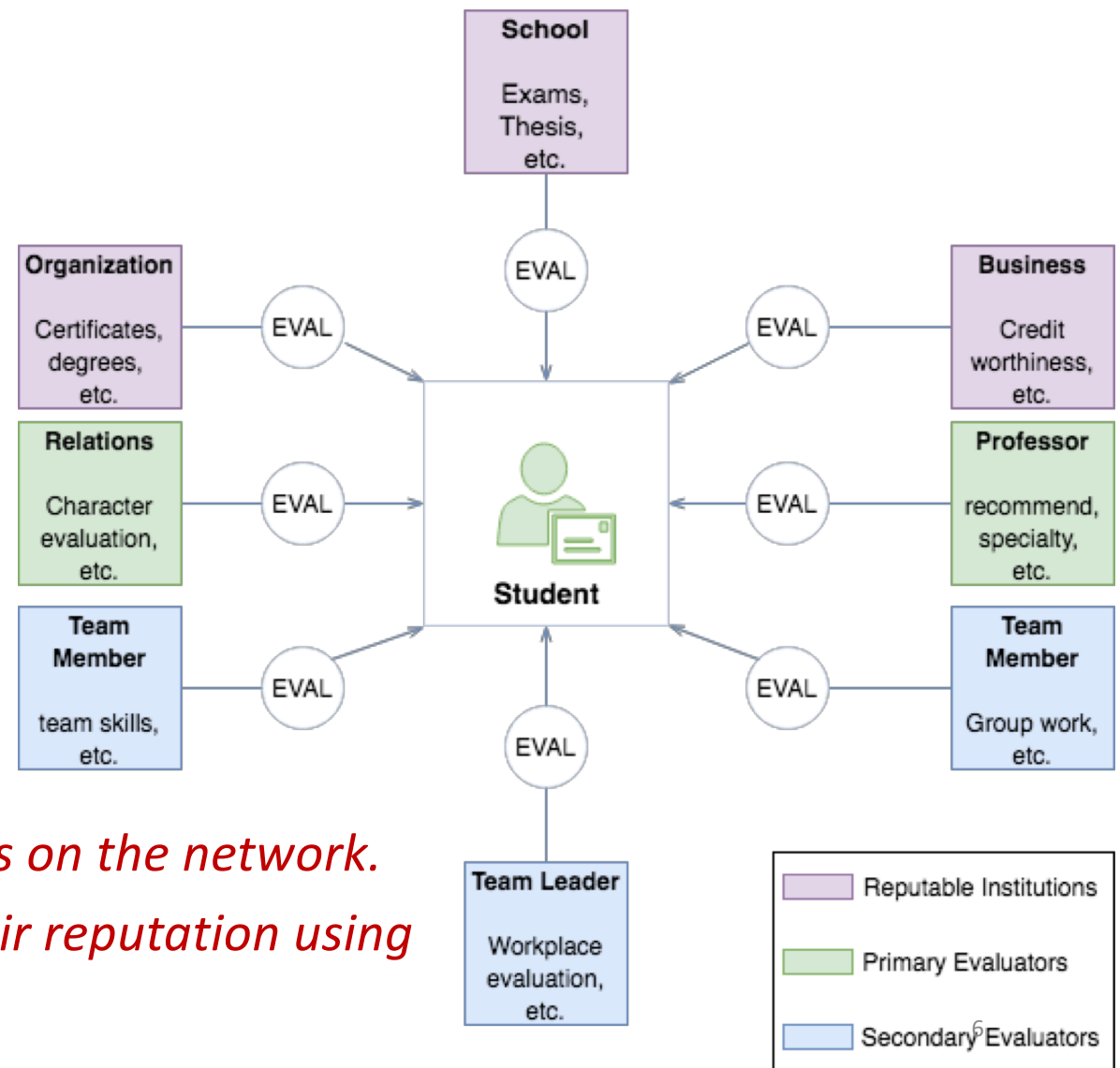
- *Evaluations are represented as blocks on the network.*
- *We use an algorithm to calculate their reputation using all the evaluations provided.*

The architecture

User Interface

Student

Teachers

Other evaluators

Social networks

Public key 🔑
Private key 🔑

Student₁ evaluation

Academic
100
75
50
25
0
Athletic
Social skill
Artistic
Team work

Evaluation

Application

Write

Academic

Social skill

Artistic

Team work

Athletic

Calculate

Database

HASH
signature
student₁
🔑 🔑
teacher₁
🔑

HASH
signature
student₁
🔑
teacher₁
🔑 🔑

HASH
signature
student₁
🔑 🔑
teacher₁
🔑
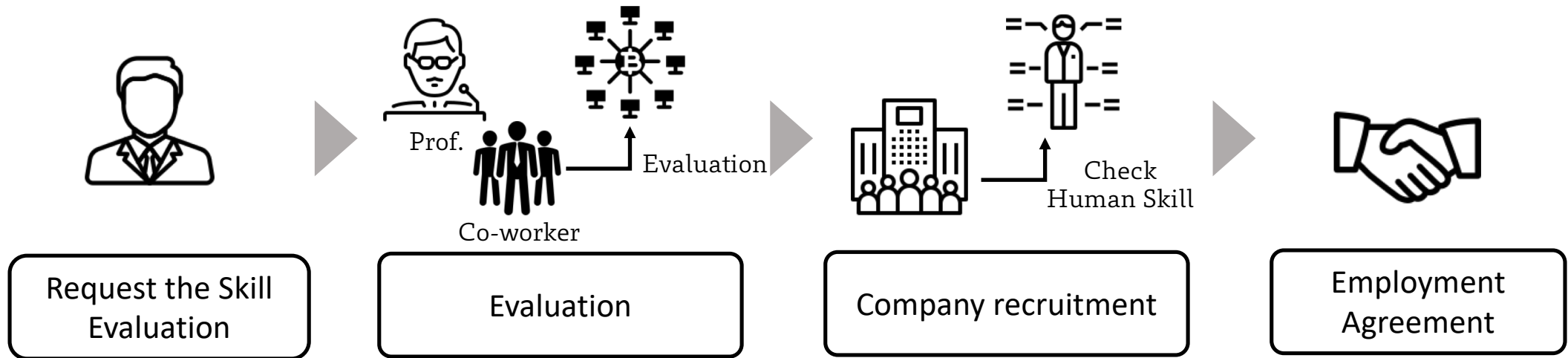
HASH
signature
student₁
🔑
manager₁
🔑 🔑

+ 🗄

7

Process flow example

1. Student sends evaluation request to Professor.

2. Professor can accept or reject request.

3. If accepted, Professor signs the evaluation with their key.

4. If the Professor's key is valid, the evaluation is written to the blockchain.
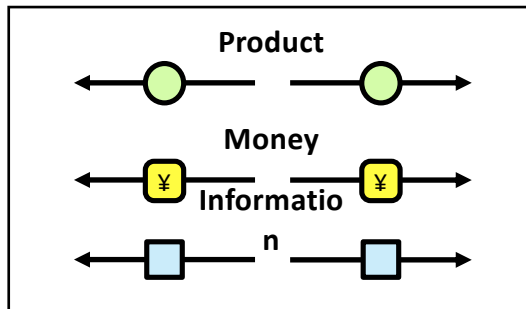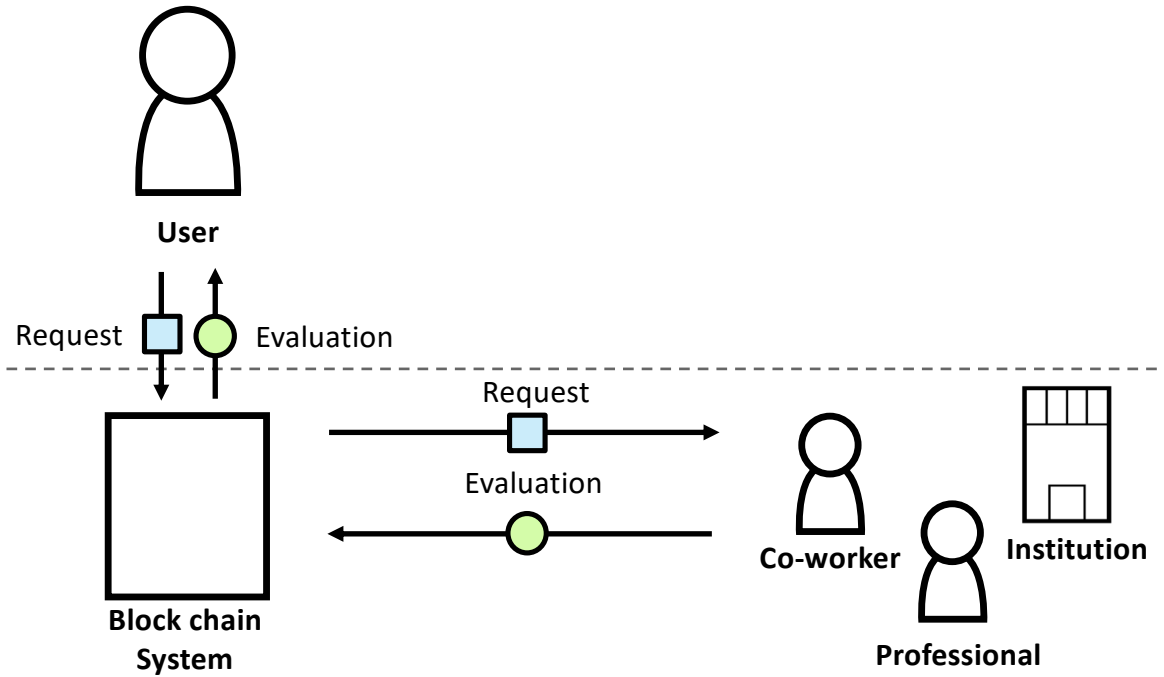

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Business model - Summary

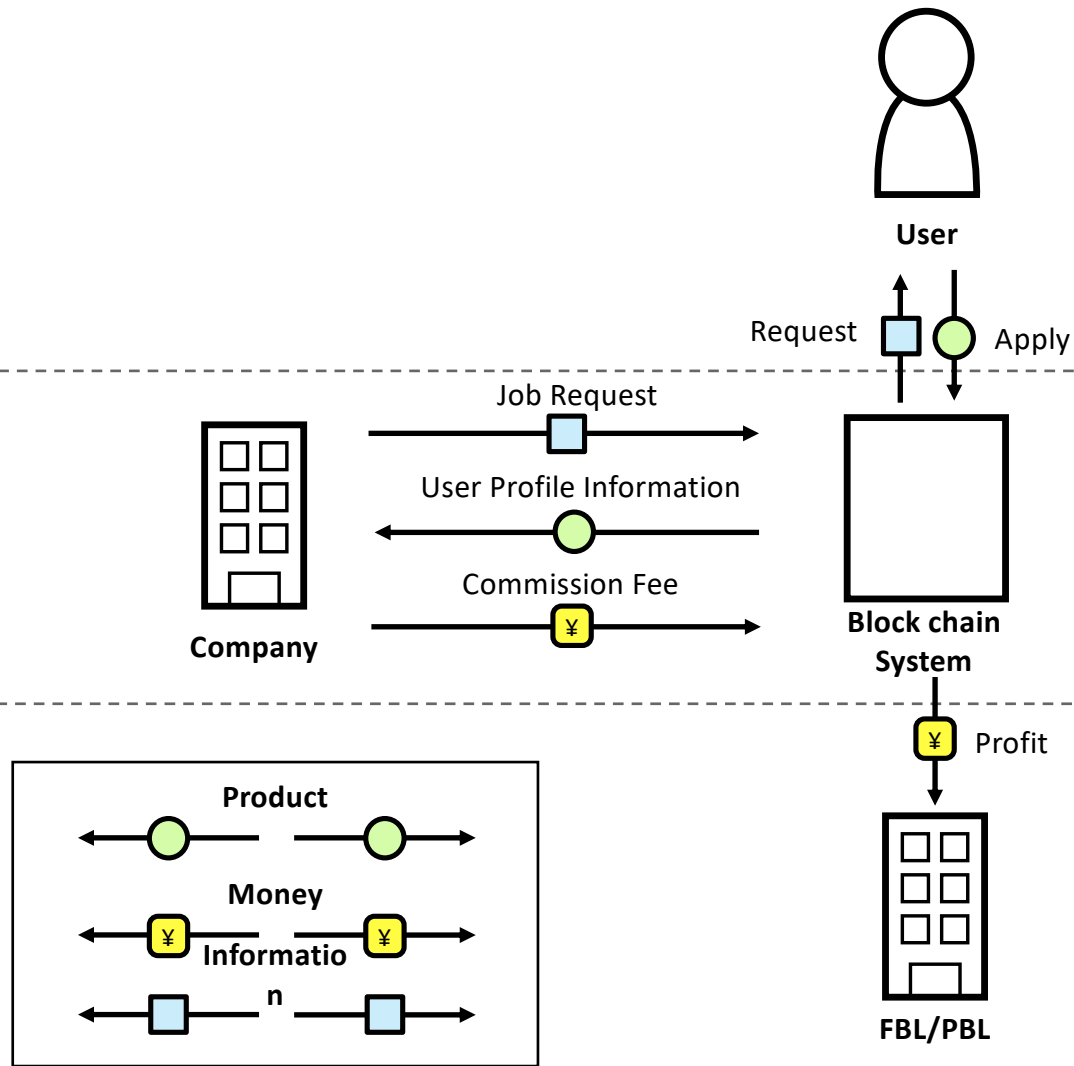**Request the Skill Evaluation** → **Evaluation** → **Company recruitment** → **Employment Agreement**

- This system allows us to evaluate many type of skills like communication and negotiation skills, leadership programming skill and so on.

- The block chain system enable us to create a reliable record, in other words, the system create a database with high levels of credibility which can not be falsified.

- Skills Mismatch often results from the disparity between the value that the employer expects in terms of the applicant's skills, and the value that the job applicant reports when applying. With the introduction of a third expert party to evaluate the applicants' skills we generate an objective and more reliable evaluation to decrease these mismatches situations.
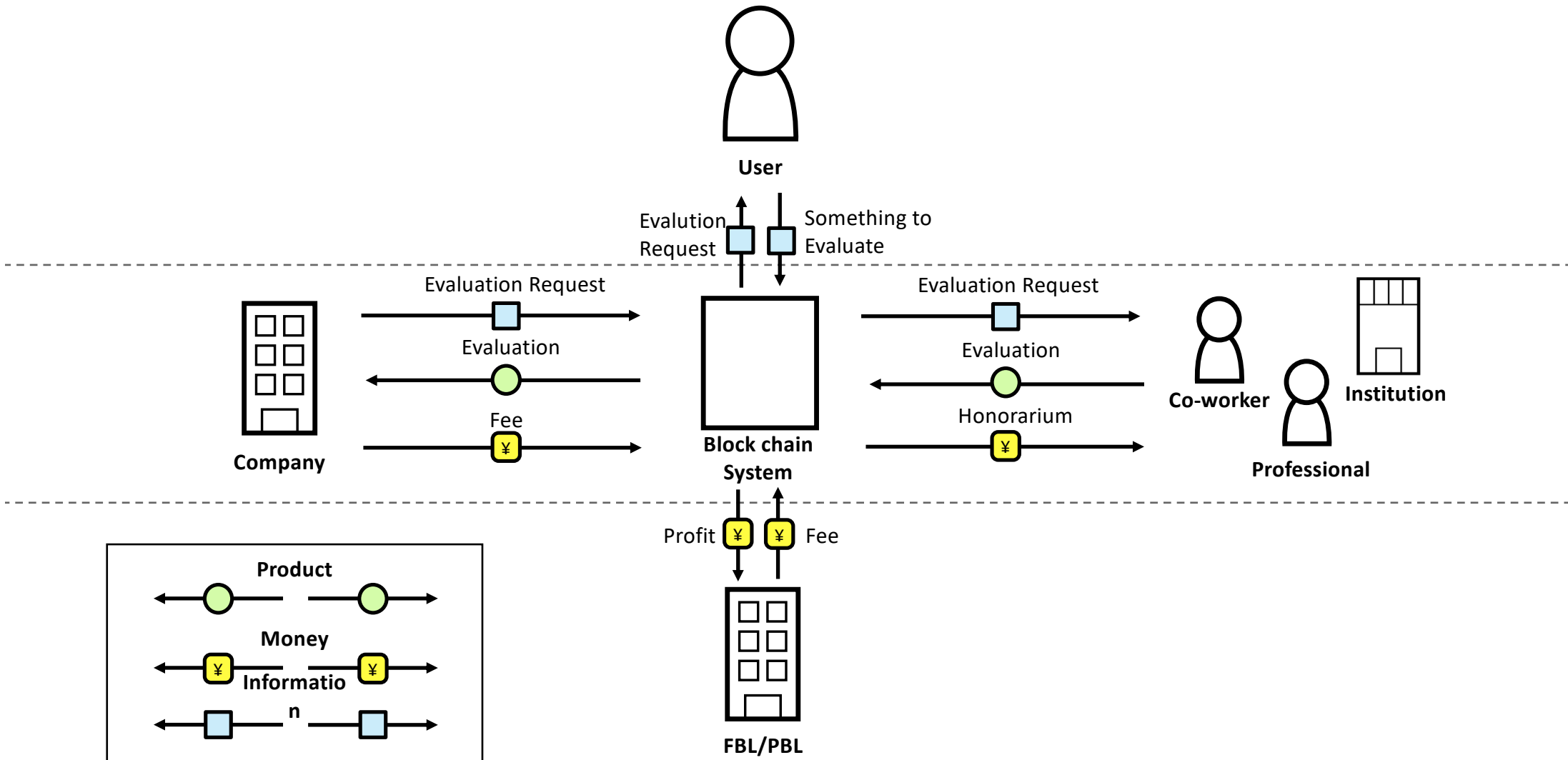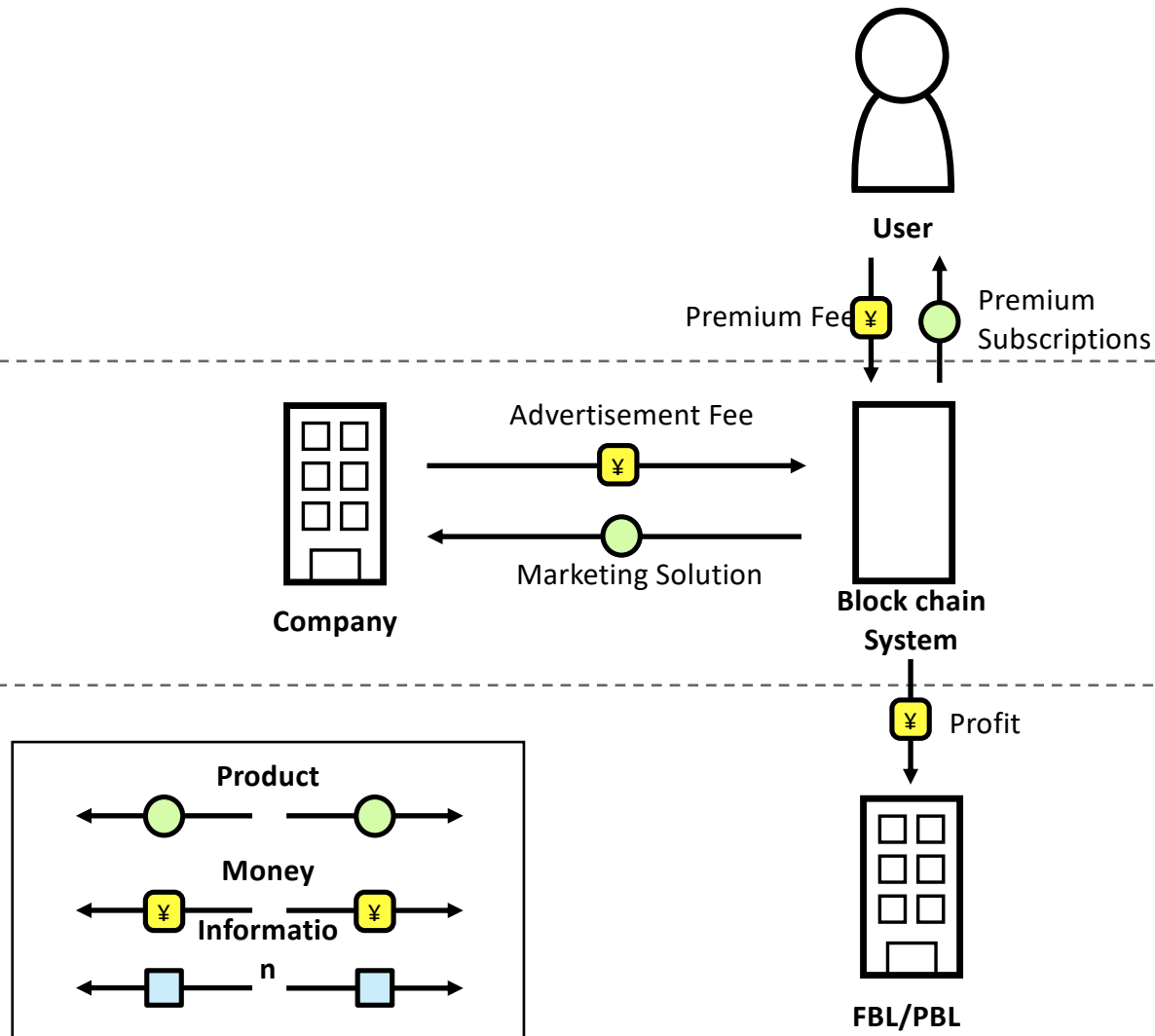
9

●Evaluation(Free)

User

Request Evaluation

Block chain System

Request

Evaluation

Co-worker

Institution

Professional

Product

Money

Informatio n

●Job Request

●Evaluation(Company Request)

●Advertisement & Premium

User

Premium Fee

Premium Subscriptions

Advertisement Fee

Marketing Solution

Company

Block chain System

Profit

FBL/PBL

Product

Money

Information

Conclusion

- We proposed a framework to enable distributed evaluation using Blockchain technology

- The system:
  - **Decentralize the evaluations** and evaluate **many types of skills**
  - Create a **reliable record** (database with high levels of credibility which can not be falsified)
  - Propose a **business model**
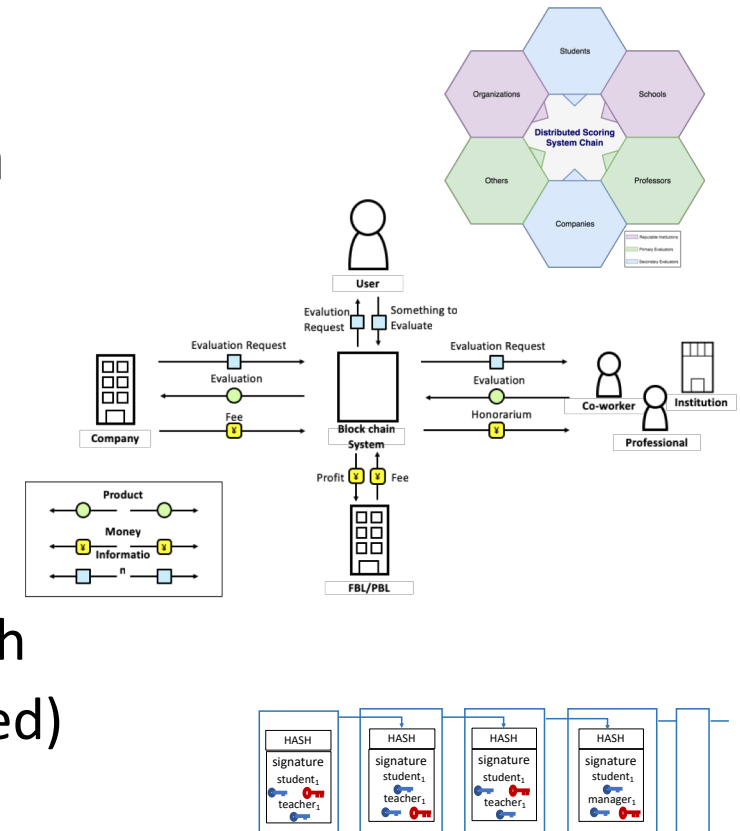
There are much more to explore in how the technology can assist education system. 14