

EMPOWERING UNIVERSITY STUDENTS WITH BLOCKCHAIN-BASED TRANSCRIPTS

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ABSTRACT

Blockchain has emerged as a transformative technology, from its beginning as the basis of cryptocurrencies to wider applications in areas such as property registration and insurance due to its characteristic as a distributed ledger which can remove the need for a trusted third party to facilitate transaction. This spread of the technology to new application areas has been driven by the development of smart contracts – blockchain-based protocols which can automatically enforce a contract. One area where the types of problems being considered for blockchain exists is higher education. Students in higher education are increasingly mobile, and in an ever more agile world, the friction and delays caused by multiple levels of administration in higher education can cause many anxieties and hardships for students. primary platform for higher education promises to open up higher education to a wider range of learners than ever before. In this reflection paper, we give our initial considerations on the use of blockchain technology as a primary platform on which to base university transcripts in order to empower students and better fit today's ever more agile society.

KEYWORDS

Blockchain, Smart Contracts, Higher Education

1. INTRODUCTION

Blockchain burst onto the scene with a paper published by the pseudonymous Satoshi Nakamoto in 2008 and was subsequently incorporated as part of the architecture of the cryptocurrency bitcoin in the following year. Blockchain, which is an open, distributed ledger that can efficiently record transactions between two parties in a verifiable and permanent way and which can also be programmed (via so-called smart contracts) to trigger transactions automatically (Iansiti and Lakhani, 2017). As a foundational technology (like TCP/IP), blockchain has been used or proposed for use in applications far beyond cryptocurrencies, including banking (Peters and Panayi, 2016), land registration – especially in developing countries (Underwood, 2016), insurance (Lamberti, F., et al., 2017), and online voting (Ayed, 2017). In this reflection paper, we give our initial thoughts on another promising area for blockchain technology – higher education records (university transcripts).

2. DISCUSSION

In today's world, learners are more mobile than ever before. University students move from one university to another, both within one country as well as between countries. This may happen within a single degree program (student starts at a community college, moves to 4-year college X and then transfers to university Y where she completes her degree), or when completing one program and moving on to another (student completes his undergraduate degree at institute X in country Y and then starts a graduate program at institute W in country Z). Students today expect to be able to do this with a minimum of difficulty (for instance, credits for courses already taken should be transferred to the new institution so those courses don't have to be repeated).

Governments (at the state level in the USA as well at the national and international level – EU, for instance) have reacted to this new reality by passing laws to facilitate student mobility by mandating transfer of credits, etc. Universities have reacted as well in some cases, streamlining transfer of credit, admissions, transcript requests, and so on, but the record is very uneven and not nearly as frictionless as should be expected in today's agile world.

We posit that a solution (at least partial) to this problem can be achieved through the introduction of blockchain technology for student records. We propose having all of a student's records attached to that student (empowering him or her) rather than have them spread among a myriad of institutions. The student transcript (for all of the institutions attended by the student) will be stored on the distributed ledger which is the blockchain. The trust built into the blockchain means that we no longer need a 3rd party (the university) when, for instance, a potential employer requests an official transcript. Instead, an authenticated electronic transcript can be delivered immediately for a nominal fee (that fraction of a cent needed to fund the distributed infrastructure which makes up the blockchain). Compare that with the situation many students face of paying sometimes significant amounts of money to have a university send their official transcript, sometimes requiring several days time – too long in today's agile world!

There are many significant advantages to this approach to student records, but here we mention just a few. Storing student records in the distributed ledger of the blockchain rather than having individual universities storing them will result in cost advantages for those universities which they can pass on to students in the form of lower fees/tuitions as they can eliminate or streamline departments/offices (registrar's office), resulting in a more lean educational entity which can focus on its core mission – educating students. Storing student records in a blockchain will also allow the use of smart contracts – a computation which takes place on a distributed ledger or block chain and enforces a contract. Admissions standards can be coded as a smart contract and students can receive instantaneous admissions decisions, all at a much reduced cost – once again resulting in a leaner educational institution with savings passed on to students. Transfer of credit rules can also be encoded in smart contracts. Since the data in the transcript is itself stored on the blockchain, students will be able to see immediately which classes will transfer for credit at their new institution.

To sum up – there are many advantages to the adoption of blockchain technology for student records (transcripts). Students are empowered since they own their transcript. It is more portable, more readily available, and admissions, transfer of credit, ordering of official transcripts and other services are frictionless. Universities benefit since much of the supporting processes they provide can be outsourced or automated via blockchain allowing them to become more lean and to concentrate on their core competency – educating students – at a lower cost. We will be studying this application more in the immediate future and looking at a platform (possibly Ethereum) for implementation of a prototype system.

REFERENCES

- Ayed, A. B., 2017. A conceptual secure Blockchain-based electronic voting system. *International Journal of Network Security & Its Applications*, 93.
- Iansiti, M. and Lakhani, K. R., 2017. The truth about blockchain. *Harvard Business Review*, 95(1), 118-127.
- Lamberti, F., Gatteschi, V., Demartini, C., Pranteda, C., and Santamaria, V., 2017. Blockchain or not blockchain, that is the question of the insurance and other sectors. *IT Professional*.
- Peters, G. W. and Panayi, E., 2016. Understanding modern banking ledgers through blockchain technologies: Future of transaction processing and smart contracts on the internet of money. In *Banking Beyond Banks and Money* (pp. 239-278). Springer, Cham.
- Underwood, S., 2016. Blockchain beyond bitcoin. *Communications of the ACM*, 59(11), 15-17.