

МЕТОД ЗА ИЗСЛЕДВАНЕ НА ЕФЕКТА ОТ ПРИЛОЖЕНИЕТО НА АЛТЕРНАТИВНИ ФОРМИ ЗА СТИМУЛИРАНЕ НА ВИСОКИ РЕЗУЛТАТИ

A METHOD FOR EXPLORING THE EFFECT OF THE APPLICATION OF ALTERNATIVE FORMS OF INCENTIVIZATION FOR HIGH PERFORMANCE

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Abstract. The OS.University (OSU) R&D project promises to bridge this gap between the industry sector and Academia via blockchain technologies. Its main output is a decentralized platform that serves as a smart ledger for authentication of achievements. On the platform, learners create a digital wallet featuring verified education and work credentials. From here, they connect with educators and businesses to find global academic and career development opportunities. Schools and universities are being offered a faster, transparent and more cost-effective mean of sharing and checking credentials, while businesses are provided with instant access to a global pool of talent with traceable credentials for smarter recruitment. All of the parties are being incentivized to participate and outperform through distribution of blockchain-based cryptographic tokens. The article presents a method for exploring the actual effect of such an alternative form for incentivization of high performance and its potential application beyond the OSU use case.

Keywords: Participatory Research, University College London, EdTech, Performance Management, Blockchain, Theory of Change

1. Introduction

Since the end of the Second World War, we have seen a movement towards centralized systems. These centralized systems work in an economic sense, but they tend to establish a status quo where specific groups are being favoured, while sharing between communities and individuals is either discouraged or put in an disadvantaged position. The same is true for the field of higher education and research where contrary to the open nature of science, institutional interests prevail over peer-to-peer exchange of opportunities and resources.

The new wave of open source innovations, such as blockchain technologies, which tend to decentralize and open-up closed systems, are extremely valuable in the attempt to encourage the sustainable development of higher education and research organizations in line with the overall paradigm shift, happening in the broader economy. [4]

The purpose of this report is to present an approach to measure the actual change, (according to the theory of change framework on fig. 1), created by blockchain-based pilot projects, such as the OS.University platform, which is built, following a thorough key success factors' exploration and application of best practices identified.

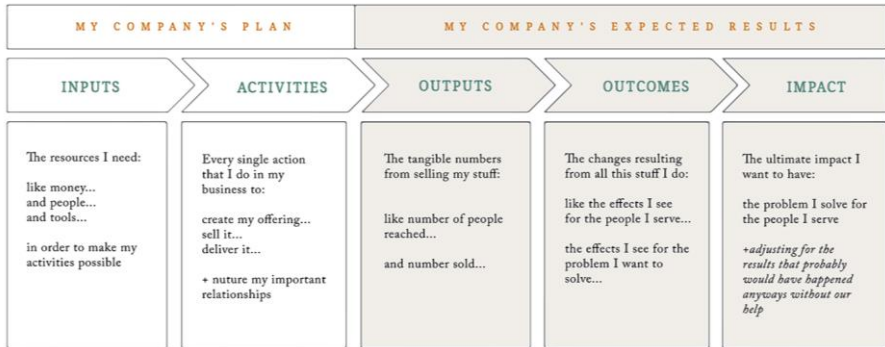


Fig. 1. Theory of Change framework – a methodology for planning, participation, and evaluation that is used to promote social change across sectors (NGO, public, EdTech, etc.)

A concept for a participatory research method is brought forward, based on the guidance provided by University College London (UCL) through its EDUCATE research incubation program. The method is expected to validate the success of certain self-organizing, platform-driven models, which utilizing Ethereum-based smart contracts and reward-driven behavioural architecture, tend to achieve the element of sustainability of operations in the absence of a strict hierarchy and the costs associated to it.

2. Overview

In May 2015, the European Commission presented a strategy to create a Digital Single Market where people and businesses can make the most of what digitization offers. This includes EU actions and funds to accompany Member States so that people can develop the right skills for new jobs and professional opportunities. [5] Verifying would-be candidates in the globalizing business and academic worlds, however, is no small task - there's no quick model to validate dispersed credentials and there can be a communication gap/mismatch between the academic and business sectors. Companies are spending 30+ days per candidate when reviewing experience and competences, resolving miscommunicated or false data. Universities may require months when authenticating or certifying the legality of diplomas, certificates. [3]

Based on this exact context, the reward-winning OS.University platform is a worthy pilot project to look at, research-wise, given the intensification that is happening in the field of learning. As Alvin Toffler wrote, the illiterate of the 21st century will not be those who cannot read and write, but the ones who cannot learn, unlearn, and re-learn.

This growing demand for learning every day, everywhere, creates the need to rethink how we validate & verify learning in the Digital Era. And while doing so, to separate the actual solutions that deliver change from the overhyped many. More and more prominent voices, such as Prof. John Domingue, Director of The Knowledge Media Institute, consider that this change we speak of, needs to happen in an instant, trusted, decentralized manner, beyond institutional and national borders. To help learners & employees claim and advance their educational and professional identity, OS.University introduces the digital credentials wallet as a service. Its success as a de-facto standard for validation and verification depends on its mass adoption on the side of learners, educations, and corporations. The role of cryptocurrency-type of digital tokens for the adoption of the educational technology and for its effectiveness as an edtech solution that brings change, is being explored as part of the research. Does it really incentivize high performance? Moreover, how can we prove this methodologically, so that the approach can be reused industry-wide, beyond the OSU use-case?

To help find the answers, the article looks into a method, derived from the experience of OSU team, working with UCL's EDUCATE program. EDUCATE is a rigorous and comprehensive training programme designed to help start-ups, SMEs, entrepreneurs and educators to develop, evaluate and improve their products and services with the use of research evidence. Based at the Knowledge Lab, at UCL's Institute of Education, EDUCATE is match-funded by the European Regional Development Fund and UCL's partners: UCL Engineering, the British Educational Suppliers Association (BESA), Nesta and F6S. This collaboration brings together all the strands of knowledge, experience and expertise needed to produce world-class EdTech. It should be underlined that the EDUCATE programme's distinct focus is on pedagogical research and 'what works'.

2.1. Research Questions

Two are the main questions that the researcher raises in order to prove/disprove the effect of the application of such an alternative form for incentivization of high performance, as the EDU token:

The first question is *“Are token-based incentive schemes affecting edtech adoption and retention levels?”* There is the assumption that learners will create blockchain-based credentials wallets and further utilize them as a result of an early incentivization with EDU tokens. Therefore the number and the utilization of wallets/accounts will be measured among token-incentivized and control groups.

The second question is *„Are token-based incentive schemes generating edtech network effects?“* There is the assumption that the EDU token can play a role not only as a catalyst when it comes to blockchain technology adoption in education, but that it can also play an instrumental role for the sustainable development of the project it is part of, through indirect network effects, which are key to achieving the impact we are looking for, i.e. the formation of a striving decentralized, self-enhancing community of learners, educators, and businesses.

2.2. Research Topicality

The outcomes of the research are expected to not only prove the utility of the EDU token within the OS.University project, but to also be of use when assessing the utility of other cryptographic tokens in non-cryptocurrency blockchain projects, primarily from network building and sustainability point of view. This is of especial importance, given that there isn't an industry-wide agreement [7] on whether digital tokens bring value to the penetration of blockchain in different fields beyond finance or if they are actually harming the mass adoption of the underlying technology within a certain industry, due to their ambivalent public perception. [2]

2.3. Research Methodology

The proposed approach on the research is centered around the cooperation with the newly established multidisciplinary Center for Shared Science and Business at the Technical University of Sofia (<https://tu-cssb.org/>).

TU Sofia is chosen as a partner, given that it is the largest educational and scientific complex in Bulgaria in the field of technical and applied science with an institutional accreditation grade of 9.5 (on the scale of 10) for the period 2012 – 2018. CSSB has the statute of an applied science laboratory, established on March 28th 2018 by the Academic Council of TU Sofia on recommendation by the Faculty of Management and the Faculty of Electronic Engineering. The Center is interested in assessing the effect of blockchain technologies on learning outcomes in higher education, but also on the blockchain technology itself, given its potential for broad implementation in the areas of manufacturing, supply chains, etc.

Four study groups from within the Department of Industrial Management at the Faculty of Management, comprising of approx. 50 students, enrolled in 2nd and 3rd year of their undergraduate studies, studying classes in 'Industrial Engineering' and 'Production Management', are expected to be actively involved in the research. The members of two study group from each of the two subjects, are to be offered the opportunity to get rewarded with EDU tokens upon achieving certain educational milestones, enabled through the OS.University platform, such as:

- a) when creating blockchain-based credentials wallets and validating their course grades on the Ethereum blockchain through their wallets/accounts;
- b) when building and/or enrolling into tailored learning pathways, oriented around their core course subject;
- c) when outperforming throughout their semestrial exercises.

One of the other two control groups will be encouraged to achieve the exact same learning outcomes, but through a bonus grade-oriented scheme incentivization, while the second control group will not get incentivized at all, apart from the fact that its members will be informed on the general (intrinsic) benefits, which blockchain technologies may carry when it comes to educational and professional development in the long run.

Researcher's assumption is that in the short and mid-term, there will be bigger buy-in for OSU 'credentials wallet' as a service and for the other platform functionalities when users are incentivized to try it out through EDU token distribution scheme (a tradable digital asset with actual market value beyond its utility as an access token), compared to when they are not being incentivized or when standard forms of in-class rewards and recognitions are being put in use, such as grade bonuses. The difference in the levels of adoption will serve as a proof of token's value to distributed ledger technology (DLT) adoption throughout Academia.

Further to that, a second assumption is made. While the EDU token is expected to manage to trigger technology adoption of the blockchain-based service on the side of learners, this user base of learners with registered learning accomplishments is expected to bring adopters on the side of educators (authenticating previous and providing further learning opportunities), i.e. token-based incentive schemes are expected to generate network effects. These indirect network effects (if such) – *'more token holders lead to more active OSU users, leading to more token holders'* will prove (or disprove) the concept that the EDU token is a valuable 'voucher for education', rather than simply a tradeable cryptographic asset, perceived and utilized predominantly as a speculative investment vehicle. The latter outcome will fail to support researcher's thesis that tokenization of education has positive educational impact that enriches the core-value proposition of blockchain technology application in education. [6]

2.4. Data Collection & Analysis

Quantitative and qualitative data will be collected through:

- a) direct observation – we will be comparing quantitative data, regarding initial adoption and retention rates among token-incentivized learners and the controlled groups throughout the course of 2 academic years;
- b) interviews and surveys – qualitative data will be collected from learners on the perceived utility of the edtech solution they are leveraging and on the (potentially) reinforcing role of the EDU token;
- c) usage metrics – quantitative and qualitative data points will be collected through the OS.University platform itself and other tracking tools (such as Etherscan), aiming to bring clarity on how the platform is being utilized in terms of functionality and activity online – are wallets being actively leveraged to record off-campus learning, are tokens being spent on core educational use cases, rather than transferred off the platform.

Self-reporting through surveys will also be part of the overall mix as OSU open-source platform for education and career development aims to empower the next generation of learners to manage their education and career-development pathways without relying on third parties – by registering and verifying their accomplishments onto a distributed blockchain.

In addition to the importance of data gathering throughout the experimental research, key focus will be put on interpreting the results by drawing from the findings of renowned works on monetary incentives (in learning and beyond) and gamification in education, particularly in the light of the role of digital technologies.

Among the practical and theoretical works, serving as a foundation, are:

- Bonner, Sprinkle (2002). The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research;
- Dicheva, Dichev, Agree, Angelova (2015). Gamification in Education: A Systematic Mapping Study;
- Guryam, Kim, Park (2016). Motivation and incentives in education: Evidence from a summer reading experiment;
- Richter, Raban, Rafaeli (2015). Studying Gamification: The Effect of Rewards and Incentives on Motivation.

2.5. Ethical Considerations

An ethical issue may be considered the fact that students are expected to be sampled for a research on a technology, which is in a process of commercialization, i.e. its positive effect on achieving the learning outcomes pursued is yet to be proved. While in the context of participatory action research, which seeks to understand the world by trying to change it, collaboratively and following reflection, this may not seem as inappropriate, it is worth noting and worth taking additional measures to avoid negative side effects on the educational process through regularly disclosing all of the research work.

Last, but not least, as blockchain is a distributed database that provides an unalterable, (semi-)public record of digital transactions where each block aggregates a timestamped batch of transactions to be included in the ledger (or rather, in the blockchain) and each block is identified by a cryptographic signature, these blocks are all back-linked; that is, they refer to the signature of the previous block in the chain, and that chain can be traced all the way back to the very first block created. As such, the blockchain contains an un-editable record of all the transactions made, hence the question of data privacy and security. Learners' data is to be kept within the boundaries of the Department of Management and not a subject of broader dissemination (even within the broader project team).

3. Conclusion

The above method, proposed for exploring the effect of the application of alternative forms of incentivization for high performance, such as digital tokens implementation in the field of higher education (and beyond) is participatory in its nature, which means that it does not originate from a monolithic body of ideas and methods, but rather from a pluralistic orientation to knowledge making and social change. [1] The method is designed with the support of UCL's EDUCATE program and is awarded with an 'EdWard' badge of honour in April 2019.

The EdWards are associated with the EDUCATE programme. These badges are designed to celebrate and give recognition to those researchers who successfully complete the programme, and those who make a real world impact applying its principles in the design of their EdTech products and services. While the mark cannot be taken as an endorsement of any particular product or service, those successfully completing the programme have demonstrated a clear understanding of applying research methods and frameworks as the below (fig. 2) and how reputable evidence can assist them in developing world-class products and services that are effective and marketable, and fit for purpose.

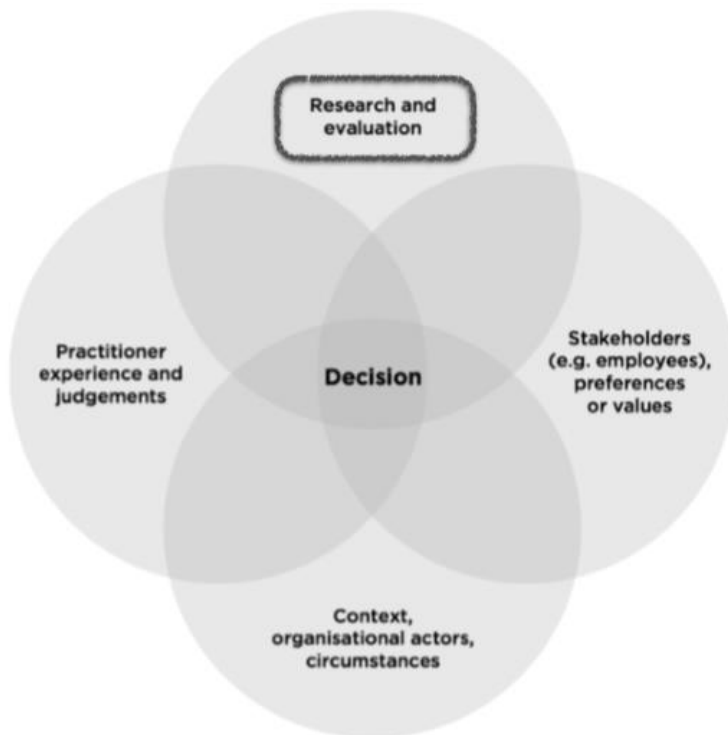


Fig. 2. Evidence-informed practice, prof. Rob Briner, Center for Evidence-based Management (management decisions, based on critical thinking and evidence).

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