

Short-term applications for blockchain technology within an ESL context

By Shawn Chattin, ESL Coin Co-op, USA

Abstract

This paper aims to help educate English as a Second Language (ESL) members on the potential benefits of implementing blockchain technology. As academic record transfer and digital publishing represent two of the simplest transformations the industry can undertake in the short-term, they represent the focus of this article, but additional, longer-term use cases are also briefly mentioned. This technological step is one that could become mainstream across global economies within the next five years, and the ESL industry is primed to be one of its major beneficiaries. With an immense demand for English instruction and resources, blockchain will help meet the world's English needs in a transparent and accountable manner.

Introduction

The ability for organizations and individuals to confidently share data with one another, regardless of location or level of familiarity, has become a reality through blockchain technology. As a response to the 2008 global financial crisis, Satoshi Nakamoto (2009) introduced the world to Bitcoin, the first practical use



case of blockchain technology. To define it as simply as possible, “a blockchain is a distributed ledger that provides a way for information to be recorded and shared by a community” (Grech & Camilleri, 2017, p. 16). Data on a blockchain cannot be copied, manipulated, or deleted, allowing users to trust that what they view on the ledger must be true. Bitcoin addresses the issue of transparent accountability regarding financial transactions, and other sectors of the economy have quickly followed suit. Some of the earliest adopters have been the supply chains of agri-food, pharmaceuticals, and high-value goods (Saberri, et al., 2019), whose level of trust in blockchain should indicate to other sectors just how trustworthy the technology is: Public health and extreme private wealth are two areas where trust is of utmost importance.

The ramifications of this social leap to absolute digital trust are exhaustive and far-reaching. By limiting the scope to the lowest hanging fruit of the English as a Second Language (ESL) industry, the power of blockchain to assist in uniting global, fragmented networks becomes clear. *Academic record transfer* and *digital publishing* contain points of friction that get to the heart of what blockchain can do across many industries.

Literature Review

As ESL-specific literature develops in its own right, literature on how blockchain will affect education as a whole has established a solid foundation. The European Union’s Joint Research Commission has published one of the most widely cited papers at the moment, *Blockchain in Education* (Grech & Camilleri, 2017), an accessible and thorough introduction that presents the logic of the technology along with descriptive use cases that go far beyond the scope of this paper. Nizamuddin et al. (2018) address how blockchain addresses reliable digital content authentication through an InterPlanetary File System (IPFS) in combination with blockchain smart contracts (Panescu, 2018). This advancement can lead to an indefinite lifespan for material through peer-to-peer distribution networks, as discussed by Rinaldi (2018). With the launch of such programs such as MIT Media Lab’s Blockcerts (Schmidt, 2016), the topic of certification and academic record transfer is discussed by Jirgensons and Kapenieks (2018). Ocheja et al. (2018) explore the possibility of individuals developing and professionally leveraging a blockchain lifelong learning record. *Blockchain and its Potential in Education* (Turcu, 2018) presents a much more extensive literature review of this topic, delving into specific international projects, both private and state-funded.

Academic Record Transfer

A learner’s academic history passes through numerous hands. The stages of primary school, high school, university, and career each involve numerous parties who obtain, manage, and pass on academic achievements. Each time the individual passes on to a new school, academic data needs to change hands,



all the way to the university stage where it finds a dead end, forcing human resource departments and university administrators into time-consuming correspondence. This process becomes even more complex and expensive if you are an international student whose academic records not only must be sent across borders but must also be reliably interpreted and evaluated (Grech & Camilleri, 2017). Professional agencies offer this service, but it often takes weeks for such evaluations to arrive with costs in the hundreds of dollars.

MIT Media Lab's Blockcerts (Schmidt, 2016) presents a solution with a blockchain-based credential repository where any issuing institution can upload digital certificates, transcripts, credits, degrees, or exam scores onto a shared network. Any participating verifying body can access the credentials by asking for permission access directly from the owner. Limiting or even eliminating 3rd party correspondence and administrative duties saves a significant amount of time while also minimizing financial costs. The direct ownership of instantly distributable and trusted digital credentials empowers the owner and increases the value of the credentials themselves.

Additionally, blockchain challenges the presiding conception of what an academic record can be. Currently, the most reliable, and hence valuable, data is linked to a student's GPA, standardized exam scores, and overarching degrees. However, admissions officers and employers also collectively value all the smaller experiences and accomplishments between these traditional credentials (Williams, 2019). The problem has always been how to add them all together in a manner that accurately reflects an individual's knowledge, skills, and character. The digital learning badges provided by blockchain certification repositories will allow for experiences such as academic fairs, formal presentations, and volunteer work, to carry more weight in admissions and employment decisions. As an example, a shared database would allow an MIT admissions officer to properly value one high school science fair in Japan over another.

These microcredentials have the potential to facilitate continuous learning across an individual's lifetime (Ocheja et al., 2019). A single 2-week certificate lacks satisfactory value by itself, but as part of decades of certificates, it helps contribute to a collective evaluation of the owner. This validation of certification programs increases competition and, consequently, the overall process. Regarding the ESL industry, there is a clear opportunity for testing and assessment services to partner more directly with institutes who issue English learning certificates to their students. For these certificates to carry weight, they must prove that the English language learner can successfully fulfill their linguistic expectations, albeit for school or work; blockchain's ability to contextualize data assists greatly with this. Like a blockchain-supported supply chain, an English language learner's academic history, including each of their schools, instructors, and exams, can be verified and accounted for with confidence.



Publishing

Although the job descriptions of those who work in ESL publishing differ greatly from those who work with academic records, their use of blockchain is quite similar, and therefore also currently feasible. Whereas digital academic records benefit from being directly linked to issuing institutions, digital content benefits from being directly linked to their creators or owners. Content such as books, worksheets, or videos that are uploaded to a blockchain start generating an immutable history. Each transaction is verified and put into the blockchain, allowing the creator or owner to receive a precise picture of who is using their content, why they are using it, and how it helps with target language acquisition.

This immutability starts with a timestamp that marks its origin. This timestamp can be used as evidence of copyright if the owner believes their content has been either plagiarized or pirated (Finck & Moscon, 2019). If a content owner's timestamp has an earlier date than that of another's, the lawsuit or claim should find a quick and relatively cheap conclusion barring any other evidence. The value of knowing who is using published content extends beyond issues of legality as the quantity of use can lead to an increase in revenue generated, and the demographics of use can lead to content creators finding their valuable niche. As a piece of content continues to amass usage statistics, that content can start proving its academic worth if linked to its users' academic assessment performance.

Blockchain publishing also allows for secure peer-to-peer (P2P) file sharing. Without blockchain, P2P sharing holds inherent risk as one peer does not know if the other peer is sending them the target file or not. Now that blockchains can reliably verify the authenticity and complete transaction history of a file, content can live outside of a single server, ensuring that it will not be lost to a targeted cyberattack or a website shutdown (Rinaldi, 2018). P2P sharing can also accelerate the circulation of content through incentives. If, for instance, Person A shares content with Person B, the owner of the content can automatically reward Person A in the form of a microcommission. With this ability to incentivize a global network of sharing, blockchain content could spread much more quickly than content guarded by centralized servers.

ESL content is produced by both formal publishing houses as well as independent teachers and/or graphic designers. The demand for quality content from English language learners is extremely high, but often they have difficulty finding content that meets their expectations. The mutually shared data and ease of payment will help direct and motivate content creators to publish what the English learners desire. An additional benefit of blockchain for publishing is the ability to split revenue in an automatic and precise way (Grech & Camilleri, 2017). Each time content is purchased, the payment is split per the stipulations set in the agreed upon smart contract. This level of trust will help individual creators find publishing teams that complement their skills and not worry about being deceived financially.



Other Potential Uses

Academic record transfer and digital content publishing represent two foundational pieces of a blockchain ESL ecosystem because of the simple task they demand: verifying the origin and history of documents and files. However, the potential of digital smart contracts, such as those on the Ethereum blockchain (Panescu, 2018), will allow for a wide array of creative applications. A few more:

Messaging Platforms

Conversational texts and calls are an excellent low-stress way to further language development. However, two of the biggest barriers have been trust and ease of payment. Trust can instantly be established through secure digital IDs (Grech & Camilleri, 2017), while the power and flexibility of cryptocurrencies provides incentives to converse with English language learners (Sharples & Domingue, 2016). These fees can be priced to the second without any cross-border fees and minimal intermediary fees. A ten-minute wait at a bus stop in Seoul could result in a retiree in Toronto receiving a monetary reward, reputation increase, and a short, pleasant intercultural conversation.

Community English

Despite the sharp increase of learners learning online, the community where the learner lives arguably presents their greatest learning opportunity. Restaurants, cafes, markets, art studios, and gyms can all become verifiable ESL-friendly locations, incentivized by rewards and reputation. English learners coming into a new area could benefit greatly knowing that there is a cafe nearby that makes non-native speakers feel comfortable. These community locations could even introduce learning activities or challenges, making the English learning experience communally interactive.

Research

One of the long-term benefits with which blockchain will help the ESL industry is the massive amount of data it will offer language acquisition researchers. By being able to track the material, activities and the environment English language learners engage in will illuminate the effects of methodologies and learning paths. The key to second language acquisition has been an infuriating puzzle for so long because it is one made up of numerous, difficult to record experiences, habits, and routines. Blockchain data will likely not give definitive answers to second language acquisition, but the amount of analysis should bear some interesting fruits.



Limitations

The biggest hurdle blockchain has faced is that of widespread adoption. As government regulators and major financial institutions figure out how to manage cryptocurrencies, the mainstream has started to think about the technology, but not yet apply it. Along with improving and streamlining the user experience, blockchain also requires an educated public, especially when it comes to maintaining a secure digital identity. Blockchain is being leveraged at the large institutional level (such as large multinationals, banks, and universities), but it will likely be three to five years before it starts to proliferate within the general population. Until mass adoption begins in earnest, blockchain credentials will be limited in their power as potential academic records verifiers could resist committing to the technology if the number of blockchain credential issuers is low. Likewise, until much more digital content is uploaded to blockchains, their utility in claiming a copyright will be limited as it is not currently expected for content creators to protect their work on a blockchain (Finck & Moscon, 2019). Judges might be curious about blockchain as potential evidence in copyright cases, but they cannot be expected to base their decision solely on an earlier timestamp.

Conclusion

Within the area of education, the ESL industry stands at the forefront of potential blockchain beneficiaries. The amount of time and work required to transfer an academic profile or prove content origin is a burden on the amount of resources that could be spent developing curriculum, improving the quality of instruction, or purchasing valuable materials. The various other use cases could help in forming a harmonious ecosystem built around shared data. As more individuals and businesses buy into what blockchain offers, the industry can gradually become more decentralized.

ESL Coin aims to be a completely decentralized and autonomous organization that is governed by those who use it. The ESL Coin database will pay and reward participants using the cryptocurrency ESL Coin, resulting in an efficient and democratic industry-wide infrastructure. Such an organization will allow anyone to join and participate as their identities are verified via blockchain digital IDs. Large institutions and individuals alike can thrive in this high-demand, low-supply industry as blockchain technology addresses two of the biggest impediments to growth: trust and ease of payment.



References

- Finck, M., & Moscon, V. (2019). Copyright law on blockchains: Between new forms of rights administration and digital rights management 2.0. *International Review of Intellectual Property and Competition Law*, 50, 77–108. <https://doi.org/10.1007/s40319-018-00776-8>
- Grech, A. & Camilleri, A. F. (2017) Blockchain in Education. Inamorato dos Santos, A. (Ed.) EUR 28778 EN; https://publications.jrc.ec.europa.eu/repository/bitstream/JRC108255/jrc108255_blockchain_in_education%281%29.pdf
- Jirgensons, M., & Kapenieks, K. (2018). Blockchain and the future of digital learning credential assessment and management. *Journal of Teacher Education for Sustainability*, 20(1), 145–156. <https://doi.org/10.2478/jtes-2018-0009>
- Nakamoto, S. (2009). *Bitcoin: A peer-to-peer electronic cash system*. <https://bitcoin.org/bitcoin.pdf>
- Nizamuddin, N., Hasan, H., & Salah, K. (2018). IPFS-blockchain-based authenticity of online publications. In S. Chen et al. (Eds.), *Blockchain - ICBC 2018: First International Conference* (pp. 199–212). Springer International Publishing. https://doi.org/10.1007/978-3-319-94478-4_14
- Ocheja, P., Flanagan, B., Ueda, H., & Ogata, H. (2019). Managing lifelong learning records through blockchain. *RPTTEL*, 14(4). <https://doi.org/10.1186/s41039-019-0097-0>
- Panescu, A. T. (2018). Smart contracts for research data rights management over the Ethereum blockchain network. *Science & Technology Libraries*, 37(3), 235–245.
- Rinaldi, J. (2018). *Peer to peer digital rights management using blockchain*. [Master's thesis, University of the Pacific]. https://scholarlycommons.pacific.edu/uop_etds/3136
- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research*, 57(7), 2117–2135. <https://doi.org/10.1080/00207543.2018.1533261>
- Salah, K. & Hasan, H. (2018). IPFS-Blockchain-based Authenticity of Online Publications.
- Schmidt, P. (2016, October 24). *Blockcerts—an open infrastructure for academic credentials on the blockchain*. MIT Media Lab. <https://medium.com/mit-media-lab/blockcerts-an-open-infrastructure-for-academic-credentials-on-the-blockchain-899a6b880b2f>
- Sharples, M., & Domingue, J. (2016). The blockchain and kudos: A distributed system for educational record, reputation and reward. In K. Verbert, M. Sharples, and T. Klobočar (Eds.), *Adaptive and adaptable learning* (pp. 490–496). Springer International Publishing.
- Williams, P. (2019). Does competency-based education with blockchain signal a new mission for universities? *Journal of Higher Education Policy and Management*, 41(1), 104–117.



Author Bio.

Shawn Chattin graduated from Ohio University with a BA in Applied Linguistics. He currently works at The Academy at Harvard Square, an institution that assists English language learners (ELLs) achieve their academic goals. His methodology focuses on finding an optimal combination of both Krashen's Natural Approach and the Direct Method. His interest in blockchain technology developed from a desire to find precise data to help direct his approach. He plans to help develop the ESL Coin Co-op, a decentralized organization of ESL industry members seeking to use blockchain to solidify the ESL industry.