

Education Sector Hotline

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BLOCKCHAINING EDUCATION - LEGAL NUANCES TO KNOW!

The last few years have seen an unprecedented increase in the use of technology across sectors. The education industry in particular has adapted well to this change. It has integrated technology almost seamlessly into its existing frameworks, both for the delivery of course content and ancillary objectives like administrative tasks and solutions for paying fees. One such new, upcoming and revolutionary technology is blockchain, which offers potentially great solutions to the education sector, for storing certificates, verification of credentials, rewarding students for task completion and intellectual property management, *et al.*

WHAT IS BLOCKCHAIN?

Fundamentally, a blockchain is a decentralised network facilitating transactions between multiple participants usually across different locations. It stores a record of all transactions which occur on it in separate "blocks". It is 'decentralised' because these records are distributed across devices of each participant in the network, and no single entity controls the network, unlike traditional databases. In the case of public blockchains, this data can be accessed by anyone with an internet connection, while private blockchains generally require participants to provide a security key before they can access the blockchain database.

Blockchain offers a unique way for securing data through a decentralized system, and this storage is immutable in nature, meaning that data once stored on the blockchain cannot be removed, tampered with or altered by third parties. For instance, if a document is stored on a blockchain network in block "A", a change made to this document would create an entirely different block "B", making it possible to identify and track all changes made to the document in a secure manner.

Although blockchain came into vogue primarily as part of cryptocurrencies like Bitcoin, the distributed manner of storing information used by blockchain systems has several other uses which go much beyond payments and trading.

HOW CAN IT BE USED IN THE EDUCATION SECTOR?

The need to expand use blockchain technology in the education sector has been acknowledged by the government in the National Education Policy, 2020 ("NEP"). The NEP lists blockchain as one of the emerging technologies which will likely gain prominence in the education sector in the near future.¹

i. Student Identity Verification

The permanent and highly secure nature of data stored on the blockchain can be leveraged by schools, colleges and universities to assign an identity to their students. A digital identity which is created for a student on the blockchain could have numerous benefits as well. It would enable schools and universities to easily create a record of a student, and to update their records in a secure manner. This digital identity can also be used by students as an all-access pass to use all virtual resources being offered by an institution. The key advantage of integrating the blockchain to verify student identities is that: (a) it is highly secure compared to digital solutions currently in the market; and (b) advancements of students can be easily tracked on the blockchain by studying the newer blocks added on the chain.²

ii. Authentication of university degree and certificates

As an example, the Massachusetts Institute of Technology (MIT) has been using blockchain technology to issue certificates to its students since 2015.³

In India as well, the use of blockchain in issuing authenticated and secure university certificates is being explored by an initiative called the SuperCert, a collaboration between the NITI Aayog and the Indian School of Business.⁴ This platform has been proposed to issue course certificates through a permissioned blockchain architecture. Through SuperCert, each student is assigned a unique identity, which may be used by employers to verify the authenticity of their certificates.

This system creates a fingerprint, or a hashed version of the certificates that are uploaded on the blockchain. At the time of verification, the SuperCert system compares this hashed fingerprint of the original certificates with the certificates provided to employers by students. Employers are informed in case any discrepancy is detected in the document provided by students. Such a system ensures that the privacy of students is protected (since employers do not access the original certificates which remain with the university), without compromising the authenticity of certificates.

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In a recent development, the Maharashtra Government has announced that it intends to use an Ethereum-based blockchain network to verify student diplomas issued by the Maharashtra State Board of Skill Development

("MSBSD").⁵ This marks a first in the country, and it is expected that almost one million certificates will be issued in connection with this project. However, unlike the proposed SuperCert solution which relies on a private blockchain, the MSBSD's use of the Ethereum network to implement verification solutions will be on a public, permission-less blockchain, and interestingly, requires the use of 'Ether' a cryptocurrency / crypto-asset, to function.

Such usage of blockchain to verify certificates streamlines the process of issuing certificates by reducing the procedural formalities around it. It also significantly decreases the expenses incurred by educational institutions in issuing certificates and degrees, while ensuring the security of the document at the same time.⁶

iii. **Tokens as Rewards for Task Completion**

Another application that blockchain technology has in the education sector is through initiatives like "BitDegree".⁷ BitDegree is an example of a Massive Open Online Course ("MOOC"), and employs a "learn to earn" model. It uses the public Ethereum blockchain to build tokens which are used to incentivise its users who learn certain skills. Such tokens have limited uses, such as taking paid courses at educational institutes.

iv. **Intellectual Property Management**

Management of intellectual property in the context of academic research is a key application of blockchain. One such example is "Ledger", a peer-reviewed scholarly journal published online by the University Library System, University of Pittsburgh.⁸ It allows users to digitally sign their documents using their bitcoin private keys, and timestamp published manuscripts in the blockchain. Such systems are helpful in automatically tracking the originators of documents and identifying authors. Since data stored on the blockchain is permanent and tamper-proof, it is ensured that the integrity of academic research is preserved in a secure manner.

v. **Payments**

Blockchain technology may also be used by educational institutions to accept cryptocurrency payments from students as a safe and secure alternative to the traditional methods of payment, depending on the regulatory landscape for such methods in the relevant jurisdiction. Several universities across the world have begun to accept cryptocurrencies as a valid mode for the payment of tuition fees.⁹

LEGAL AND REGULATORY CHALLENGES

Privacy and Data Protection

Widescale adoption of blockchain technology will certainly revolutionise the existing framework of the education sector. However, considering that this will involve the storage of highly sensitive personal data of students on a decentralised network, educational institutions should ensure that they take all possible measures to protect the information of their students on the blockchain. The current regulatory landscape on data protection in India is governed by the Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011 ("SPDI Rules"). The SPDI Rules define sensitive personal data to include information such as financial information, medical records, biometric information, etc. Under the SPDI Rules, body corporates which collect, receive, possess, store, deal or handle sensitive personal data of others, in an electronic form, must follow the requirements under these rules, which *inter alia* include obtaining consent for collecting such data from the providers of information and refraining from retaining the sensitive personal data for longer than required for the purpose of such collection.

The SPDI Rules will likely be applicable where data about student identities and degree certificates is made available on the blockchain. This is because such data could include , biometric information and financial data, which is treated by the SPDI Rules as "sensitive personal data

To comply with these requirements, any educational institution seeking to use blockchain networks for document verification will have to inform students (a) that this data is being collected to facilitate future verification, and (b) that data once stored on the blockchain cannot be removed.

The SPDI Rules also mandate that certain reasonable security practices are to be established when sensitive personal data is collected. The SPDI Rules further provide certain examples of standards which would be considered sufficiently reasonable.¹⁰ Where universities are relying heavily on the blockchain to store student data, there is no clarity if such standards under the SPDI Rules can be considered to be satisfied. This is because these requirements under the SPDI Rules have been targeted at systems which store personal data in a single location. However, data on blockchains are stored in a decentralised and distributed manner, meaning that it may be practically impossible to implement these specific security standards in the systems of all participants on the blockchain network.

Spill-over effects of a potential cryptocurrency ban

Recently, it was reported that, pursuant to an Inter-Ministerial Committee recommendation of 2019, the Indian government is considering a ban on dealing with all private cryptocurrencies.¹¹ However, in this context, the latest statement of the Finance Minister has been that "a futuristic thing can't be shut out".¹² The matter is reportedly pending consideration of the Union Cabinet.¹³ A ban on cryptocurrencies may affect digital assets, including those generated by MOOCs such as BitDegree to reward students completing tasks successfully, as well as a pioneering program like that of the MSBSD, as discussed above.

Experts have opined that it may be difficult to separate blockchains from cryptocurrency.¹⁴ This is because blockchains usually reward participants on the chain for expending energy to authenticate transactions by giving them crypto assets. Without such crypto assets, participants on the chain may not be incentivised to validate entries in the distributed blockchain ledger. Hence, a potential ban on cryptocurrencies may severely limit the use of blockchain technology for many of the purposes outlined above.¹⁵ One such example of a system which may be negatively impacted by a ban on cryptocurrency is that of the recent solution for certificate verification introduced by

the Maharashtra State Government discussed above. Since this solution uses Ethereum, a public blockchain which relies on cryptocurrency to function, a crypto ban is likely to impede this initiative and restrict access to the certificates uploaded on the blockchain.

Cybersecurity

Though the data storage and verification on the blockchain has been touted to be one of the most secure means ever devised, cybersecurity vulnerabilities are not entirely eliminated. For instance, there have been several recent situations where hackers gained unauthorised access to information on the chain, and exploited the information contained therein.¹⁶ Though this is technically more difficult to achieve than by hacking traditional centralised systems, blockchain networks do have some vulnerabilities which may be exploited. For example, where blockchain networks rely on a majority consensus mechanism (meaning that a transaction on the blockchain is authenticated if more than 50% of the computing power of the network has authorised it), it would be possible for hackers to take over this system by gaining control of more than half of all the computing power on the network. This could have disastrous results where universities and other educational institutions rely on the blockchain to store and authenticate student information especially where the personal data of students is concerned

To manage the risks presented by such eventualities, universities should implement strong cybersecurity frameworks including negotiating contractual protections with other participants and undertaking continuous monitoring of the network for security incidents.¹⁷ In addition, such institutions should also ensure that they comply with requirements under the Information Technology Act, 2000 of India and similar laws which require body corporates to report unauthorised uses of computer resources to the relevant authorities within a reasonable timeframe.¹⁸

OUR TAKE

The blockchain technology offers significant advantages to the education sector across the globe and could significantly decentralise and democratise access to education. In India, particularly, the opportunities offered by blockchain technology in the sector are only beginning to be explored by the government and private players alike. This also offers opportunities for new and allied business models in the education space.

Further, the government has presented a positive outlook towards the use of blockchain technology for improving education in the country under the NEP. We foresee more acceptability and adoption of blockchain in education in the new future.

— Athira Sankar, Jaideep Reddy & Aarushi Jain

You can direct your queries or comments to the authors

¹ National Education Policy, 2020 at page 56, https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf (last accessed on September 21, 2021).

² Andrew Tobin, Jamie Smith, *Self-Sovereign Identity for Higher Education*, <https://www.evemymcomblog/self-sovereign-identity-higher-education/> (last accessed on September 21, 2021)

³ Elizabeth Durant, Alison Trachy, *Digital Diploma debuts at MIT*, <https://news.mit.edu/2017/mit-debuts-secure-digital-diploma-using-bitcoin-blockchain-technology-1017> (last accessed on September 21, 2021)

⁴ NITI Aayog Draft Discussion Paper, *Blockchain: The India Strategy*, January 2020.

⁵ Ledger Insights, *Indian state government launches blockchain educational certificates*, ledgerinsights.com/indian-state-government-launches-blockchain-educational-certificates/ (last accessed on September 21, 2021)

⁶ Rachel Wolfson, *US Education Department Promotes Putting Student Records On Blockchain* <https://cointelegraph.com/news/us-education-department-promotes-putting-student-records-on-blockchain> (last accessed on September 21, 2021).

⁷ <https://www.bitdegree.org/> (last accessed on September 21, 2021)

⁸ <https://ledgerjournal.org/ojs/ledger/about> (last accessed on September 21, 2021)

⁹ *Universities Accept Bitcoin Payments to Ease the Burden on International Students*, <https://www.analyticsinsight.net/top-universities-and-schools-accepting-bitcoin-payments/> (last accessed on September 22, 2021)

¹⁰ IS/ISO/IEC 27001 standards on Information Technology - Security Techniques - Information Security Management System – Requirements

¹¹ The Indian Express, *RBI plans and an upcoming Bill: Where are digital currencies headed?*

<https://indianexpress.com/article/explained/cryptocurrency-bitcoin-rbi-7285249/> (last accessed on September 21, 2021)

¹² Hindustan Times, *On Cryptocurrency, Sitharaman Says 'We Have To Be Cautious But Think It Through'*, <https://www.hindustantimes.com/business/on-cryptocurrency-sitharaman-says-we-have-to-be-cautious-but-think-it-through-101632189095218.html> (last accessed on September 22, 2021)

¹³ Economic Times, *Waiting for Cabinet approval, says FM Nirmala Sitharaman on bill on cryptocurrency*, <https://economictimes.indiatimes.com/news/economy/policy/waiting-for-cabinet-approval-says-nirmala-sitharaman-on-bill-on-cryptocurrency/articleshow/85372886.cms?from=mdr>

¹⁴ Russia's Crypto Ban Would Stifle Blockchains, <https://news.bitcoin.com/buterin-ban-russia-stifle-blockchains/> (last accessed on September 21, 2021)

¹⁵ Note: Initiatives like SuperCert may not face this issue, since they rely on a private/permissioned blockchain, meaning that all participants on this chain can be identified by the central authority. The spillover effect may hence be a significant issue only where universities are taking resort to *public* blockchain structures. See <https://www.steptoe.com/images/content/1/8/v2/189187/Cybersecurity-Tech-Basics-Blockchain-Technology-Cyber-Risks-and.pdf> (last accessed on September 21, 2021)

¹⁶ MIT Technology Review, *Once Hailed As Unhackable, Blockchains Are Now Getting Hacked*, <https://www.technologyreview.com/2019/02/19/239592/once-hailed-as-unhackable-blockchains-are-now-getting-hacked/> (last accessed on September 21, 2021)

¹⁷ <https://www.steptoe.com/images/content/1/8/v2/189187/Cybersecurity-Tech-Basics-Blockchain-Technology-Cyber-Risks-and.pdf> (last accessed on September 21, 2021)

¹⁸ See *Reporting cybersecurity breaches in India – Is it time to overhaul the law?*, by Apama Gaur, Aarushi Jain, Gowree Gokhale and Dr. Mihir A. Parikh, available at <https://www.natlawreview.com/article/reporting-cybersecurity-breaches-india-it-time-to-overhaul-law> (last accessed on September 21, 2021).

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