



Blockchain Beyond Cryptocurrencies

This editorial is based on [“Blockchain in Schools and Colleges”](#) which was published in Indian Express on 30/12/2021. It talks about the significance of blockchain technology in the field of education.

For Prelims: Blockchain Technology, NEP 2020, cryptocurrencies.

For Mains: Blockchain technology in transforming several key areas like education, voting, medical records etc., Issues associated with adoption of blockchain technology, Blockchain as an enabler in achieving NEP 2020 objectives.

Until now, the [blockchain technology](#) has been most prominently heard with reference to cryptocurrencies. It has been known as a **technology that enables the [Bitcoins](#) and [Ethereums](#) of the world.**

However, a bigger story lies there in the **potential of blockchain technology to transform other key sectors**, one such sector this technology could truly revolutionise is **education**.

In this context, the Prime Minister of India recently launched a system to award **blockchain-based educational degrees in digital forms**.

Blockchain Technology and Education

- **About Blockchain:** Blockchain derives its name from the **digital databases or ledgers where information is stored as “blocks”** that are coupled together forming **“chains”**.
 - It offers a singular combination of permanent and tamper-evident record keeping, real-time transaction transparency and auditability.
 - An exact **copy of the blockchain is available to each of the multiple computers** or users who are **joined together in a network**.
 - Any new information added or altered via a new block is to be vetted and approved by over half the total users.
- **Significance of Blockchain:**
 - Blockchain technology **can facilitate innovations across a range of processes and applications** requiring management, storage, retrieval and safety of vast and important information.
 - These include - management of information pertaining to financial transactions (as in the case of cryptocurrencies), [electoral voting](#), medical records, academic lessons, property ownership records and professional testimonials.
 - A **decentralised framework** like blockchain makes the system and the information stored therein **fraud-proof, transparent and credible**.
- **Blockchain and Digital Education:**

- **Fulfilling the Objectives of NEP 2020:** The [National Education Policy \(NEP\) 2020](#) calls for introducing multidisciplinary education where students would be able to choose their own combination of major and minor subjects along with flexibility in course duration.
 - In this context, blockchain can help **implement a multiple-entry-and-exit structure.**
- **Displaying Skill Badges:** Further, students can be assured of the quality of teachers and educators as the technology could **enable educators to display their certified Skill Badges**, allowing students to opt for courses in an informed manner.
 - Moreover, the students, especially those in higher education and research, **can adopt Skill Badges to indicate their proficiencies.**
 - This would **enable faculty to identify the right students for projects.**
- **Designing Scholarship Ecosystem:** A blockchain-based ecosystem could also be used to **design a scholarship system incentivising students to maintain consistency** and achieve academic excellence.
- **Record-Keeping:** It would be a secure system that **ensures educational records remain immutable.**
 - Blockchain can provide an excellent framework to **manage student records ranging from day-to-day information** such as assignments, attendance and extracurricular activities, to information about degrees and colleges they have attended.
 - These could be **relied upon by prospective educational institutions and recruiters**, who can be provided access to relevant records.
- **Monitoring Faculty Performance:** The blockchain ledger would provide a **time-stamped and tamper-proof record of faculty performance** - student evaluations, number of students opting for their electives, research output and publications.
 - These records could be linked to faculty appraisal systems, thereby ensuring greater accountability.
- **Learner-Centric Model:** Using blockchain in education will lead to a **truly learner-centric model** where **learners are not just receivers but also the co-creators** and teachers are not just sending information one way but becoming more participative.

Challenges Associated to Blockchain Technology

- **Low Scalability:** In reality, blockchains work fine for a small number of users. However, when the user number increases on the network, **the transitions take longer to process.**
 - As a result, the **transactions cost higher than usual.** It also **restricts more users on the network.**
- **Security Challenges:** Blockchains are **vulnerable to network attacks** as they were **not originally designed for network protocols.** There are challenges of insertion of malware files and objectionable content as Blockchain services continue to grow.
 - This **raises issues of privacy violation**, potentially illegal files, copyright violations, malware etc.
- **Interoperability:** Interoperability is another sore point. It **still is in its nascent stage in the country** and a lot needs to be done in many key areas.
- **Immutability:** One of the features of the technology is its immutability — that is, once some data has been entered, it cannot be altered or deleted.
 - It poses a challenge as it **eliminates the possibility of modifying student records for legitimate purposes.**
- **Lack of Technology Experts:** In the current regulatory environment, Indian **developers do not have the ability to develop open blockchain solutions** at scale.
 - Blockchain professionals are **migrating rapidly to countries with more friendly regulations.**
 - As a result India's ability to benefit from jobs, capital, local innovation and positioning is all curtailed without the talent ecosystem in place.

Way Forward

- **Addressing Related Concerns:** The adoption of blockchain in education could help improve the efficiency of the education ecosystem and optimise the use of human and physical resources.

- While doing so, concerns such as data privacy, cost, scalability and integration with legacy systems will have to be addressed.
- Doing so is worth every penny as it would help **usher in an educational system that is better equipped** to handle higher enrolment while being secure, transparent, collaborative, creative and future-ready.
- **Investment for Digital Education:** Transition from teacher-class based teaching to digital-education will need multi-pronged efforts over time. For students, teachers and institutions, **more investment and better infrastructure is a necessity** that must be fulfilled.
 - **Investments are required in digital education and related technologies** to achieve the ambitious targets of NEP 2020 and to provide education that is holistic and multidisciplinary.
- **Creating a Robust DEE with Blockchain:** There are several aspects to making a robust Digital Education Ecosystem (DEE) — content development, teaching, evaluations, grading, attendance recording, achievements, certificates, degrees and diplomas.
 - **Stakeholders** such as educational institutions, prospective employers, mentors and certification agencies can be **integrated into a DEE**.
 - There is also an **inherent need for more secure and fool-proof systems for tracking students' academic activities** and providing the required information to all stakeholders.
 - The blockchain can emerge as a viable solution to manage such an integrated DEE.

Conclusion

The Covid-19 pandemic has affected educational institutions worldwide and it seems like the widespread use of digital technology in education is here to stay. With better investments, technological expertise and government interventions, Blockchain technology has the potential to write a new chapter in the field of digital education.

Drishti Mains Question

So far the Blockchain has been known as a technology that enables the Bitcoins and Ethernets of the world. However, it has immense potential to transform other key sectors like education as well. Discuss.