

Research on Blockchain technology and its application in education management problems

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Abstract: This study investigates the application of blockchain technology to address critical challenges in educational management systems, including credential verification, data security, and academic record transparency. Traditional centralized databases are vulnerable to tampering, single points of failure, and inefficient cross-institutional data sharing. By leveraging blockchain's decentralized, immutable ledger and smart contract capabilities, this research proposes a framework for storing and verifying academic credentials, transcripts, and certificates. The system ensures data integrity, eliminates forgery risks, and enables instant, trustless verification by employers or other institutions. Additionally, the study explores the use of smart contracts to automate administrative processes such as enrollment, grade recording, and degree issuance. A prototype was developed and evaluated for performance, scalability, and security. Results demonstrate that blockchain-based educational management significantly enhances data reliability and operational efficiency while reducing administrative overhead. The findings provide a viable pathway for modernizing educational governance, particularly in developing contexts where trust in centralized authorities is limited.

Keywords: Blockchain, education management, Blockchain application, blockchain technology