

Chapter 8

Blockchain and Tokenomics for Education: Unlocking Micro–Credentials, Equity, and Lifelong Learning — An Overview

Mussa Saidi Abubakari

 <https://orcid.org/0000-0003-3782-281X>

*Dig Connectivity Research Laboratory (DCRLab), Uganda & Universiti Brunei
Darussalam, Brunei*

Lawal Abdulwahab Olamilekan

 <https://orcid.org/0000-0003-4955-244X>

Accord University, Mogadishu, Somalia

ABSTRACT

The chapter explores the transformative potential of blockchain and tokenomics in reshaping education through secure micro-credentialing, equitable access, and lifelong learning. Drawing on recent peer-reviewed literature, it examines how blockchain enables tamper-proof academic records, portable micro-credentials, and learner-owned digital wallets, while tokenomics introduces incentive-driven ecosystems such as “learn-to-earn” and peer-to-peer knowledge sharing. The chapter also investigates the role of decentralized autonomous organisations in collaborative curriculum governance and community-led accreditation. Emphasising global case studies and policy implications, it critically assesses challenges including data privacy, regulatory uncertainty, and digital divides. The analysis highlights how blockchain-based systems can democratise education by recognising informal and

DOI: 10.4018/979-8-3373-3371-7.ch008

modular learning across borders. It concludes by advocating for inclusive, ethical, and scalable implementation strategies to ensure blockchain and tokenomics advance equity and continuous learning in education.

1. INTRODUCTION

Background: Contextualising the Digital Transformation in Education

Education systems worldwide are undergoing rapid digital transformation. Emerging technologies like artificial intelligence, big data, and blockchain are reshaping how learning is delivered, tracked, and recognised. In particular, blockchain technology- originally devised for cryptocurrency – has expanded into non-financial domains, offering new ways to manage data and credentials. Its unique features of decentralisation, transparency, and immutability have attracted interest in education as a means to address persistent challenges in record-keeping, credential verification, and trust (Silaghi & Popescu, 2025). Across all sectors of education (K-12, higher education, vocational training, and informal learning), stakeholders are exploring blockchain-based solutions to improve efficiency and equity in credentialing and student data management.

The Rise of Blockchain and Tokenomics in Global Sectors: Beyond finance, blockchain has been piloted in supply chains, healthcare, government, and now education as a tool for secure information exchange. In parallel, “Tokenomics” – the design of economic systems using digital tokens – has gained prominence in the context of Web3 (the decentralised web). Tokenomics leverages blockchain tokens (fungible or non-fungible) to create incentive structures within ecosystems (Freni et al., 2022). Education is beginning to tap into Tokenomics by issuing tokens as rewards for learning achievements or as governance tools in academic communities. This convergence of blockchain and token economies in education has given rise to experiments like learn-to-earn programs that reward students with cryptocurrency for completing learning tasks (Weiss & Salman, 2022), and pilot projects using blockchain tokens to fund students in rural schools. Globally, initiatives span from Europe’s exploration of cross-border blockchain credentialing to developing countries testing blockchain for combating credential fraud and improving access (Alnafrak & Mouselli, 2021; de Alwis et al., 2025; Silaghi & Popescu, 2025). These efforts signal a burgeoning interest in harnessing blockchain and tokens to foster more trustworthy, learner-centred education systems.

The transformational potential of Tokenomics and blockchain in digital education is vast but fragmented, holding promise for more equitable access to and recognition

34 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/blockchain-and-tokenomics-for-education/402834

Related Content

Application of AI in Big Data Processing

Chandradeep Bhatt, Devang Shukla, Indrajeet Kumarand Krishna Kant Agrawal (2024). *Applications of Parallel Data Processing for Biomedical Imaging* (pp. 58-68). www.irma-international.org/chapter/application-of-ai-in-big-data-processing/345591

New Tools for Cyber Security Using Blockchain Technology and Avatar-Based Management Technique

Vardan Mkrтчhian, Leyla Ayvarovna Gamidullaeva, Yulia Vertakovaand Svetlana Panasenko (2021). *Research Anthology on Blockchain Technology in Business, Healthcare, Education, and Government* (pp. 628-641). www.irma-international.org/chapter/new-tools-for-cyber-security-using-blockchain-technology-and-avatar-based-management-technique/268625

An Automatic Video Reinforcing System for TV Programs using Semantic Metadata from Closed Captions

Yuanyuan Wang, Daisuke Kitayama, Yukiko Kawai, Kazutoshi Sumiyaand Yoshiharu Ishikawa (2016). *International Journal of Multimedia Data Engineering and Management* (pp. 1-21). www.irma-international.org/article/an-automatic-video-reinforcing-system-for-tv-programs-using-semantic-metadata-from-closed-captions/149229

Weighted Association Rule Mining for Video Semantic Detection

Lin Linand Mei-Ling Shyu (2010). *International Journal of Multimedia Data Engineering and Management* (pp. 37-54). www.irma-international.org/article/weighted-association-rule-mining-video/40984

A Novel Approach for Colorization of a Grayscale Image using Soft Computing Techniques

Abul Hasnat, Santanu Halder, Debotosh Bhattacharjeeand Mita Nasipuri (2017). *International Journal of Multimedia Data Engineering and Management* (pp. 19-43). www.irma-international.org/article/a-novel-approach-for-colorization-of-a-grayscale-image-using-soft-computing-techniques/187138