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 (Alnafrah & 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