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INTEGRATING BLOCKCHAIN IN EDUCATIONAL MANAGEMENT SYSTEMS: TRANSPARENCY AND ACCOUNTABILITY IN PUBLIC ADMINISTRATION

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ABSTRACT

Blockchain application in educational administrative systems has emerged as a possible way to enhance transparency, accountability, and efficiency in administrative and academic operations. Despite its growing relevance, a systematic review of blockchain applications across public administration and the field of education is not abundant. With this inquiry, we intend to deliver an extensive literature review to highlight trends, benefits and limitations regarding the use of blockchain technology in educational governance and management in the interest of systematically reviewing and reporting empirical studies through the PRISMA methodology. A Systematic Literature Review (SLR) approach, consisting of synthesizing relevant literature according to the specification outlined by the PRISMA framework, resulted in 25 quality studies that were published between 2016-2025, selected from various peer-reviewed journals contained within the databases of IEEE Xplore, ScienceDirect, SpringerLink, Emerald Publishing, MDPI, and Wiley Online Library. Results of a thematic analysis revealed three significant themes: (1) blockchain enables secure verification of credentials, exchange of credits and green learning teaching learning processes; (2) blockchain supports public sector reform, enhancing transparency and accountability within government bodies; and (3) realization of blockchain technology has been hindered by concerns of cost, scalability, privacy and, resistance to implementation. Overall, this study suggests that blockchain can be catalytic for scaling teaching, learning and administrative processes in education and highlights the need for strategic frameworks in order to overcome technological and organizational challenges.

Keywords: *Blockchain; Educational Management Systems; Transparency; Accountability; Public Administration*

INTRODUCTION

In the last couple of years, blockchain technology has emerged as a revolutionary technology across many sectors like finance, healthcare, and government. With its unique characteristics decentralization, transparency, immutability, and security it is a prospective innovation to transform how educational management systems operate (Alammary et al., 2019; Ocheja et al., 2022). In education, blockchain offers solutions to challenges such as counterfeit

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certification, lack of transparency in administrative processes, and inefficiency in administrative record keeping (Caramihai & Severin, 2023; Raimundo & Rosário, 2021). These applications not only promote institutional reputation but also reinforce general goals of accountability and good governance in public administration.

The use of blockchain for educational management systems supports transparency through auditable and tamper-proof recording of student performance, administrative functions, and awarding of credentials (Bhaskar et al., 2021; Wang et al., 2024). The system enables stakeholders, including students, instructors, and policymakers, to access accurate information in real time, thereby preventing disputes and encouraging trust. In addition, blockchain utilization here aligns with global trends of digitalization and e-government, where accountability and efficiency are paramount objectives (Moura et al., 2020; Tan et al., 2022).

In the perspective of public administration, blockchain supports accountability as it decentralizes power and provides traceable audit trails that reduce the opportunities for corruption, bias, or records manipulation (Cagigas et al., 2021; Muhdiarta, 2025).Transparent and accountable education governance is also crucial for generating public trust in educational organizations, especially in developing countries with high levels of administrative inefficiencies (Pasaribu et al., 2024). Research has examined the possibilities of using blockchain technology with explainable artificial intelligence to enhance public governance decision-making by being efficient and understandable by all stakeholders (Jayanthi et al., 2024). While exciting, the challenges associated with implementing blockchain in public education must not be overlooked, including the high costs to implement blockchain, the technicalities of blockchain, and the reluctance for traditional institutions to adapt to efficiencies (Park, 2021; Delgado-von-Eitzen et al., 2021). Additionally, data privacy, interoperability, and scalability complicate large-scale organization (Sung & Park, 2021; Tyma et al., 2022). However, there are possible case studies, such as EduCTX, a blockchain-based credit exchange system, that shows facilitating innovation to support higher education organizations in the real world (Turkanović et al., 2018).

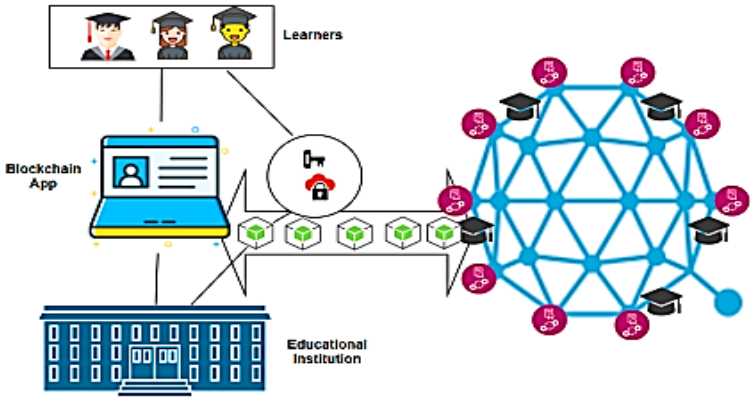


Figure 1. Blockchain-Based Educational Ecosystem for Learners and Institutions.

The figure illustrates the core interaction in a blockchain-based educational ecosystem, connecting Learners directly with an Educational Institution through a Blockchain App. This setup achieves its effect by leveraging the natural properties of decentralization and immutability, as well as the transparency of the blockchain. Alammary et al. (2019) explain

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that the potential for such applications provides a secure and verifiable method to maintain academic records. A primary use case is the issuing of diplomas and other academic certificates in digital form, where the record is secured cryptographically through the blockchain, preventing the potential for corruption, creating an efficient way for employers, institutions, and other third parties to confirm records (Turkanović et al., 2018; Caramihai & Severin, 2023). This is self-sovereign and permanent ownership of their credentials by learners, able to be accessed through the app at any time. For institutions of learning, it reduces administrative work and enhances the credibility of their credentials (Bhaskar et al., 2021; Raimundo & Rosário, 2021). Moreover, this type of infrastructure empowers more complex applications such as tracking micro-credentials, or lifelong learning transcripts, that preserve an ongoing, unalterable, secure learner record (Park, 2021). As such, adopting blockchain is not just about maintaining records, it is about providing all educational stakeholders a more open, effective and trust worthy environment.

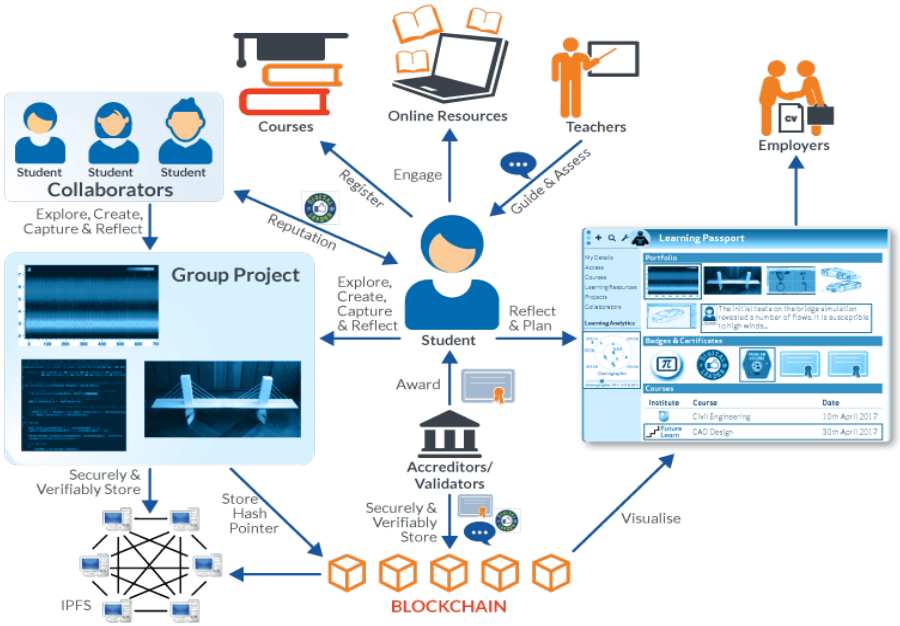


Figure 2. A Blockchain-Enabled Learning Lifecycle for Project-Based Education.

Blockchain technology is gaining a reputation as a disruptive innovation for education providing solutions for credential verification, transparent governance, and learner autonomy. As highlighted by Alammary et al. (2019), the characteristics of blockchain decentralization, immutability, and transparency make it a good fit for applications such as issuing and verifying academic certificates and diplomas, eliminating fraud and administrative processes. This is evidenced in the number of platforms, such as EduCTX, which seeks to use a blockchain to manage and trade academic credits among institutions (Turkanović et al., 2018). Beyond credentialing, blockchain provides the potential to create "learning passports" or e-portfolios which can provide a verifiably trustworthy record of achievement over the learner's career. Possible examples of this may include micro-credentials, and project-based learning (Park, 2021). By leveraging decentralized storage networks such as the Interplanetary File System (IPFS), the learning artifacts could be hashed in an immutable process, creating proof of integrity while enhancing availability of access and trustworthiness of metadata (Ocheja et al.,

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2022). In addition, the technology promotes more accountability and trust in educational administration and public administration by creating more efficient and transparent ecosystems for everyone (Cagigas et al., 2021). Nevertheless, despite the difficulties, the possibility of blockchain to have a safer, provable and student-led education ecosystem is significant.

With this understanding in mind, this study will proceed to examine three interconnected aims. First, to examine how the integration of blockchain in educational management systems can improve transparency in administrative and academic processes to ensure the integrity of record-keeping and decision- making. Second, to analyze the role of blockchain technology in improving accountability and trust in public administration and universities, and to enhance governance and reduce opportunity for manipulation. Third, it aims at defining the obstacles and challenges for an effective implementation of blockchain, with particular reference to the technical, financial, and regulatory constraints of developing countries. Satisfying these objectives will provide a comprehensive understanding of the disruptive power of blockchain in education and offer evidence-based recommendations for policymakers and institutional managers who are keen to adopt this technology for transparent and accountable educational management.

State of The Art

Blockchain technology is increasingly perceived as a revolutionary technology that has far-reaching impacts on education management systems. As an immutable, transparent, and decentralized record keeper, blockchain has fascinated academics curious about the ways it can deepen governance and trust in institutions. Alammary et al. (2019) indicated that blockchain could be advantageous to enhance operations in education, particularly academic records management, while Caramihai and Severin (2023) put forth a blockchain-based diploma management model to facilitate verifiability and reduce the incidence of higher education fraudulent behavior. Similarly, Delgado-von-Eitzen et al. (2021) provided a systematic review where blockchain may serve as an enabler of educational digital transformation in the context of safe credentialing and eliminating duplicity throughout an education system.

The application of blockchain technology in higher education has advanced significantly and is being used for a variety of functions including credential verification, management of academic transcripts, and managing credit transfers. For example, Turkanović et al (2018) described the EduCTX project that documented an applied blockchain-based system that allowed institutions to issue credits and accept credits from foreign institutions. This is an example of how blockchain can support other functions of interoperability. Similarly, Raimundo and Rosário (2021) stated that institutions used the technology in their credentialing processes to authenticate certificates as well as review and assess students' performance. The immutable record-keeping of the blockchain technology contributed to creating trust in its applications. Ocheja et al (2022) provided examples to support their stance that blockchain had improved administrative convenience and improved levels of trust related to university degree issuances and university student experiences, as a result of multiple record keeping points through blockchain technology. This convergence was supported by the umbrella findings of Wang et al (2024), and they equally called out blockchain technology in their review of systematic evaluations of frameworks for addressing university efficiency related to academic management and credential verification.

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In public administration, blockchain has been explored in the form of optimizing governance and accountability. Moura et al. (2020) conducted a systematic review with a focus on blockchain's contribution to administrative modernization and efficiency in government services. Cagigas et al. (2021) criticized blockchain applications throughout public services, and based on their review, they concluded that decentralization can significantly increase the transparency of provision of government services. Tan et al. (2022) conceptualized a framework of blockchain governance, depicting its versatility in different environments in public management. In a separate study, Ameyaw and De Vries (2020) examined land administration in Ghana and demonstrated that blockchain offers transparency, while effectively curbing corruption in the public delivery of services. This, too, was confirmed in Muhdiarta (2025), who stated that blockchain promotes accountability and good governance through the availability of immutable and traceable records in the administrative systems.

Additionally, there is literature that examines blockchain's role in accountability and trust building in higher education and other contexts as well. Bhaskar et al. (2021) addressed blockchain's present and future roles in education management, as it can provide solutions to data tampering and inefficiency. Tyma et al. (2022) dove into accountability in blockchain frameworks, noting that audit and decentralized systems have the potential to reduce opportunities for malpractice. El Koshiry et al. (2023) presented innovations in blockchain-influenced learning, demonstrating enhanced outcomes in stakeholders' trust and transparency. In a similar vein, Mufron et al. (2024) examined blockchain implementations in higher education governance and emphasized the potential for enhancing governance and efficiency at the institutional level. Nonetheless, these advantages are accompanied by a number of constraints preventing adoption. Park (2021) identified promises and challenges of blockchain in education and described the costs of adoption, reluctance to innovate, and technological complexity as significant barriers. Delgado-von-Eitzen et al. (2021) considered challenges associated with scalability and readiness of higher educational institutions for implementing blockchain. Sung and Park (2021) studied blockchain-enabled identity management, especially interoperability and privacy in public institutions. Pasaribu et al. (2024) proposed decentralized educational governance but noted policy and infrastructural challenges to blockchain implementation in the developing world.

In addition to that, researchers have suggested new ideas of blockchain applications with AI and non-formal education systems. Jayanthi et al. (2024) investigated blockchain and explainable AI for governance and demonstrated how blockchain and explainable AI complement and enhance each other with the purpose of improving transparency and informed decision-making. Nazari et al. (2024) have developed a model of combining AI and blockchain in non-formal learning. They mentioned, the flexibility of blockchain and AI technology for lifelong learning. Bucea-Manea-Ţoniş et al. (2021) also noted that blockchain will support sustainable higher education through transparent, accountable, and sustainable systems of management.

METHODS

This research undertook combining existing literature utilizing a systematic literature review (SLR) with existing literature, with a focus on accountability and transparency in public administration of the role of blockchain in educational management systems context. SLR

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followed guidelines as well as the PRISMA framework to ensure rigor, replicability, and consistency in thorough literature identification.

Research Design

In this section, the systematic literature review as a design, was selected to identify, evaluate and synthesize findings from studies related to governance and educational applications of blockchain. This approach permits scholars to take stock of the state of research in an area, provides identification of gaps and possibilities to concentrate future work (Wang et al., 2024; Alammary et al., 2019).

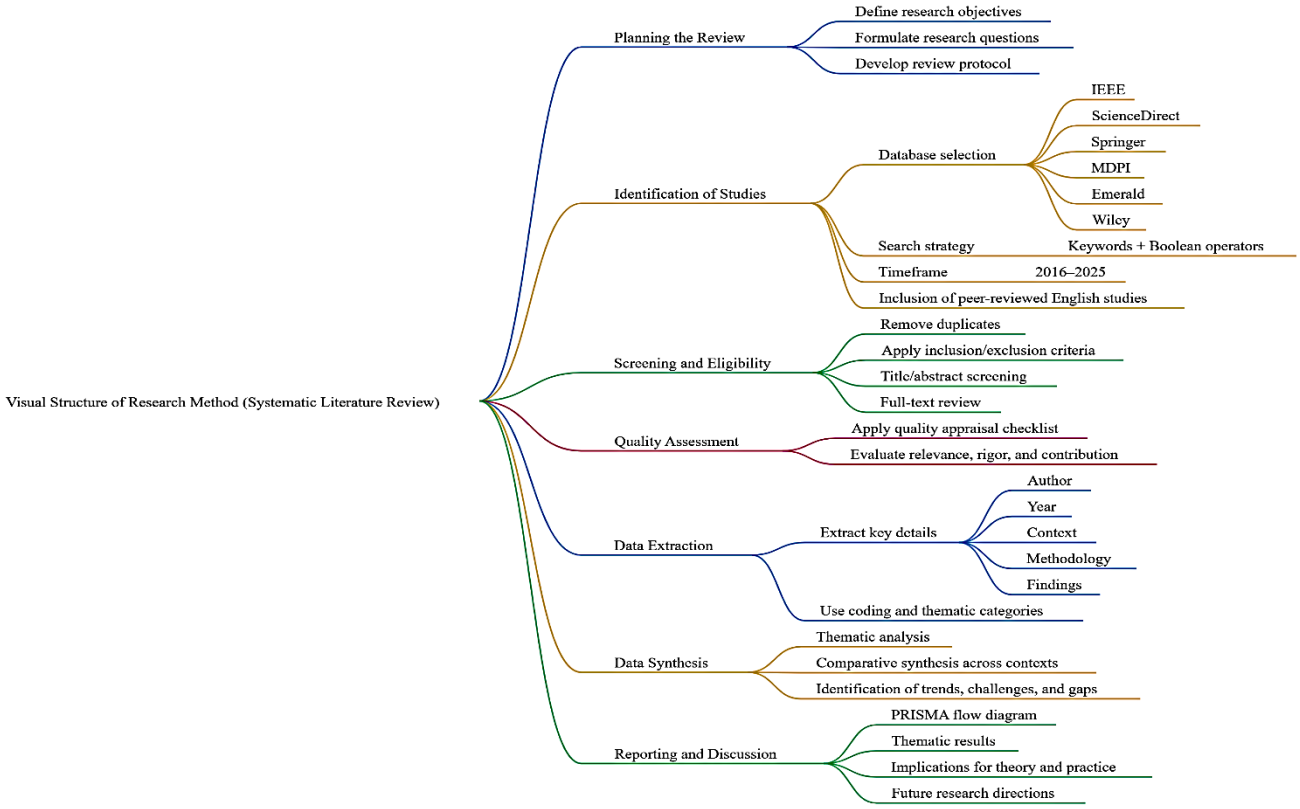


Figure 3: Systematic Workflow for Conducting a Structured Literature Review.

The diagram illustrates an organized approach to undertaking a systematic literature review (SLR). The undertaking is organized logically according to key phases: planning, identification, screening, extraction, and finally synthesis. The process begins with identifying the research question, and developing a review protocol to ensure the review is rigorous. The identification phase focuses on downloading the full article and conducting comprehensive database searching using keywords and Boolean operators. The screening process is a multi-stage assessment, including an appraisal of the study quality, that ensures studies are selected are relevant to the review research question and adhere to required quality standards. The selection of studies leads to data extraction and a thematic analysis that seeks to identify trends and gaps, which leads to findings that yield implications for theory and practice, following guidelines, such as the PRISMA flow diagram.

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Research Questions

The review was guided by three research questions derived from the study objectives:

1. How does blockchain integration in educational management systems improve transparency in administrative and academic processes?
2. In what ways does blockchain enhance accountability and trust within public administration and higher education institutions?
3. What are the challenges and barriers associated with implementing blockchain in educational management systems, particularly in developing contexts?

These questions focus on transparency, accountability, and implementation challenges, reflecting recurring themes in existing literature (Bhaskar et al., 2021; Pasaribu et al., 2024).

Search Strategy

A structured search was conducted across leading scholarly databases, including IEEE Xplore, ScienceDirect, SpringerLink, Emerald, MDPI, and Wiley Online Library. Keywords and Boolean operators included:

Table 1. Search Strategy for Blockchain Applications in Education and Governance

Database	Keywords & Boolean Operators	Inclusion Criteria
IEEE Xplore	"Blockchain" AND "Education" OR "Educational Management Systems"	Peer-reviewed, English, 2016–2025
ScienceDirect	"Blockchain" AND "Transparency" OR "Accountability"	Peer-reviewed, English, 2016–2025
SpringerLink	"Blockchain" AND "Public Administration" OR "Governance"	Peer-reviewed, English, 2016–2025
Emerald	"Blockchain" AND "Education" OR "Educational Management Systems"	Peer-reviewed, English, 2016–2025
MDPI	"Blockchain" AND "Transparency" OR "Accountability"	Peer-reviewed, English, 2016–2025
Wiley Online Library	"Blockchain" AND "Public Administration" OR "Governance"	Peer-reviewed, English, 2016–2025

A structured search was completed across six respected scholarly databases: IEEE Xplore, ScienceDirect, SpringerLink, Emerald, MDPI and Wiley Online Library, to capture literature related to blockchain utilization in education, transparency, and governance. Boolean search operators (AND/OR) were used to combine keywords like "Blockchain" with keywords "Education," "Educational Management Systems," "Transparency," "Accountability," "Public Administration" and "Governance." To capture up-to-date research and peer-reviewed literature, only articles, book chapters, and conference proceedings published since January of 2016 to December 2025 in the English language would be captured (Delgado-von-Eitzen et al., 2021; Cagigas et al., 2021). This systematic approach allowed for the identification of relevant studies and developed a justified foundation for a review of the literature regarding blockchain as an enhancement factor for educational management, accountability, and governance.

For the five searched databases, searches were limited to peer-reviewed articles, book chapters, and conference proceedings published between 2016 - 2025 in the English language (Delgado-von-Eitzen et al., 2021; Cagigas et al., 2021).

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Inclusion and Exclusion Criteria

Table 2. Inclusion and Exclusion Criteria for Blockchain Research in Education and Governance

No.	Inclusion Criteria	Exclusion Criteria
1	Studies focusing on blockchain applications in education or public administration	Non-peer-reviewed articles such as blogs, news reports, and opinions
2	Research addressing transparency, accountability, or governance	Studies unrelated to blockchain, education, or administrative systems
3	Empirical articles published in reputable journals	Duplicated records
4	Conceptual studies in reputable scholarly outlets	Incomplete manuscripts
5	Review articles providing a comprehensive synthesis of blockchain studies	Articles in languages other than English

In order to conduct a rigorous selection of literature on the utilization of blockchain in education and public administration, inclusion and exclusion criteria were established. Inclusion criteria specified literature studies that focused on examining the application of blockchain in education or public administration, literature about transparency, accountability, or governance, or empirical, conceptual, or literature review studies published in reputable peer-reviewed journals. Exclusion criteria specified peer-reviewed literature studies that did not examine blockchain, peer-reviewed literature studies that were unrelated to blockchain, duplicate studies, studies that were incomplete, and studies written in a language other than English. This systematic approach ensures only studies of high quality, relevance, and reliability in the review, so that the impact of blockchain on these domains can be fully analyzed and representative of primary analysis in education and public administration.
Moving forward in the review, it is important to note that articles such as those found in Skiba (2017) and Turcu et al. (2019) were included in the data collection process because they provided early conceptual articles, and more recent empirical work such as Caramihai and Severin (2023) and Mufron et al. (2024) were included to provide recognizing application use and more contemporary research.

Study Selection Process

The selection process followed the **PRISMA stages**:

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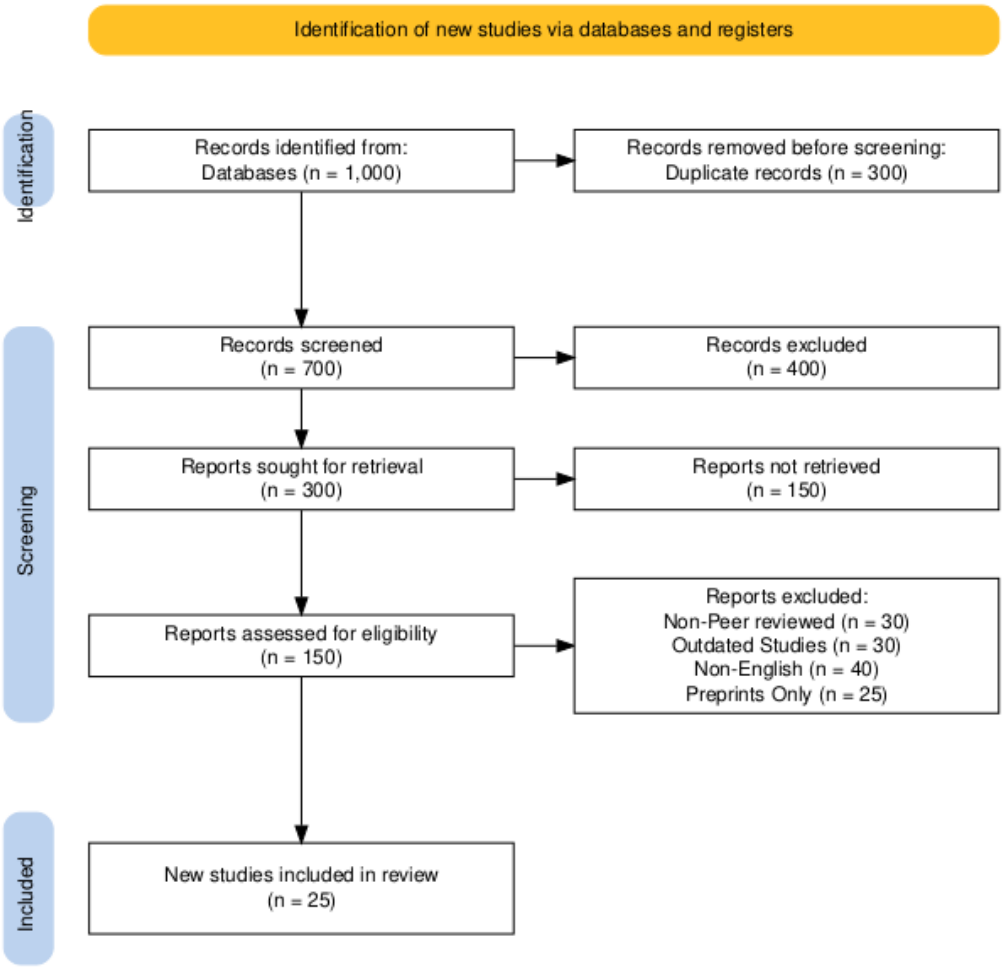


Figure 4. PRISMA Flow Diagram of Study Selection Process

Table 4. PRISMA Flow Diagram – Identification Phase

Phase	**Description**	**Number of Records**
Records identified	Records obtained from scholarly databases and registers	1,000
Duplicate records removed	Records removed due to duplication	300
Records remaining	Records remaining for screening	700

In the identification phase, a total of 1,000 records were retrieved from various databases. After removing 300 duplicate records, 700 unique records remained for the screening process. This step ensures that all studies considered for review are unique and relevant to the research topic.

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Table 5. PRISMA Flow Diagram – Screening Phase

Phase	Description	Number of Records
Records screened	All unique records reviewed based on titles and abstracts	700
Records excluded	Records eliminated for not meeting inclusion criteria	400
Records remaining	Records retained for full-text assessment	300

During the screening phase, 700 records were examined for relevance. Based on inclusion and exclusion criteria, 400 records were excluded, leaving 300 studies for detailed full-text assessment. This phase ensures that only potentially relevant studies move forward for eligibility evaluation.

Table 6. PRISMA Flow Diagram – Eligibility Phase

Phase	Description	Number of Records
Reports sought for retrieval	Full-text articles requested for detailed evaluation	300
Reports not retrieved	Full-text articles unavailable	150
Reports assessed for eligibility	Full-text articles reviewed for final inclusion	150
Reports excluded	Excluded with reasons: Non-peer-reviewed, Outdated, Non-English, Preprints	125
Reports included	Studies meeting all criteria for systematic review	25

During eligibility, 300 full-text reports were sought with 150 that could not be found. 125 of the 150 assessed were excluded for various reasons, such as 30 being non-peer-reviewed, 30 being out-of-date, 40 being in a language other than English, and 25 being preprints only. The final count amounted to 25 studies that met all of the inclusion criteria and were included in the systematic review. This phase ensures only high-quality, relevant studies form the foundation of the analysis of the review.

A final aggregate of 25 high-quality studies were used for the analysis that contained systematic reviews (Alammary et al., 2019; Ocheja et al., 2022) and empirical case studies (Turkanović et al., 2018; Raimundo & Rosário, 2021), and conceptual frameworks (Tan et al., 2022; Tyma et al., 2022).

Data Extraction and Analysis

A structured extraction form was used to record:

Table 7. *Data Extraction and Thematic Analysis of Blockchain Applications in Education and Governance*

Theme	Focus Area / Examples	Key Findings / Insights
Applications in Educational	Credential verification (Caramihai & Severin,	Blockchain enhances trust, efficiency, and interoperability in educational

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Management Systems	2023); Credit transfer (Turkanović et al., 2018); Sustainable education (Bucea-Manea-Țoniș et al., 2021)	systems. It enables secure verification of credentials, seamless credit transfer between institutions, and promotes sustainable and transparent educational practices.
Blockchain in Public Administration and Governance	Land administration transparency (Ameyaw & De Vries, 2020); Accountability frameworks (Muhdiarta, 2025); Public service reform (Moura et al., 2020)	Blockchain improves transparency and accountability in governance processes. It provides immutable records for public services, reduces corruption risks, and facilitates reform initiatives in administrative systems.
Challenges and Barriers	Scalability, cost, privacy concerns, resistance to adoption (Park, 2021; Sung & Park, 2021; Pasaribu et al., 2024)	Implementation faces technological, financial, and social obstacles. High costs, privacy concerns, technical complexity, and organizational resistance limit widespread adoption.

A structured extraction form was used to systematically collect important bibliographic information, study focus, methodology, and findings from the literature that was included. This approach allowed for a fairly rigorous thematic synthesis of blockchain applications across education and governance. Thematic analysis identified three major themes. First, Applications in Educational Management Systems highlighted three advantages: secure credential verification, credit transferability, and sustainability in education. Each of these three themes demonstrated the potential for blockchain to improve efficiency and trust within educational institutions. The second theme on Blockchain in Public Administration and Governance featured ideas surrounding transparency, accountability, and reform in different aspects of governance such as land administration and public services, which illustrated the potential of blockchain to reduce corruption as well as improve processes. The final theme discussed other critical challenges and barriers to enactment including operational costs, scalability, privacy issues, and resistance to use by stakeholders. These factors can present inaction on the potential opportunity to block technology to be used. This process ensured a full understanding of both the opportunities and challenges surrounding the enactment of blockchain, while ensuring the findings would be useful, policy relevant, and applicable towards educational and governmental institutions interested in using blockchain technology.

RESULT AND DISCUSSION

The review comprised articles published from 2017 to 2025 that examined blockchain specifically in education and governance. The studies were geographically diverse in studies from Africa, Asia, Europe, and the Middle East. The methodological approaches used were empirical studies, systematic reviews, conceptual frameworks, exploratory studies, and implementation studies. The studies focused on credential verification, credit transfer, diploma management, sustainable learning, and AI-enabled non-formal education systems in education. The study examined blockchain uses in transparency and accountability, land administration, identity management, and public service reform in governance. Together, diverse methods provide opportunities and challenges, as well as emerging trends, associated with blockchain.

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Table 8. Bibliographic and Methodological Characteristics of Selected Studies

Authors & Year	Focus Area / Domain	Study Type / Methodology
Alammary et al., 2019	Education	Systematic Review
Ameyaw & De Vries, 2020	Governance / Land Administration	Framework Analysis
Bhaskar et al., 2021	Education	Conceptual / Review
Bucea-Manea-Țoniș et al., 2021	Education / Sustainability	Empirical / Case Study
Cagigas et al., 2021	Public Services	Systematic Review
Caramihai & Severin, 2023	Education / Diploma Management	Empirical / Implementation Study
Delgado-von-Eitzen et al., 2021	Education	Systematic Review
El Koshiry et al., 2023	Education	Overview / Innovation Study
Jayanthi et al., 2024	Public Administration / AI Integration	Explorative Study / Book Chapter
Moura et al., 2020	Public Administration	Systematic Review
Mufron et al., 2024	Education Administration	Strategy / Implementation Study
Muhdiarta, 2025	Public Administration	Conceptual / Policy Analysis
Nazari et al., 2024	Non-Formal Education / AI Integration	Conceptual / Pilot Study
Ocheja et al., 2022	Education	Systematic Review / Case Studies
Park, 2021	Education	Conceptual / Challenges Study
Pasaribu et al., 2024	Education Administration	Model / Governance Study
Raimundo & Rosário, 2021	Higher Education	Empirical Study
Skiba, 2017	Education / Healthcare	Commentary / Perspective
Sung & Park, 2021	Public Sector / Identity Management	Empirical Study / Adoption
Tan et al., 2022	Public Sector Governance	Conceptual Framework

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Authors & Year	Focus Area / Domain	Study Type / Methodology
Turcu et al., 2019	Education	Preprint / Conceptual
Turkanović et al., 2018	Higher Education / Credit Platform	Empirical / Implementation Study
Tyma et al., 2022	Accountability in Blockchain Systems	Empirical / Conceptual
Wang et al., 2024	Education / Solutions & Challenges	Systematic Review
Yumna et al., 2019	Education	Systematic Review

Out of the 25 selected studies, there exists enough literature for a meaningful dataset for searching blockchain applications in educational contexts and governance. The geographical representation of the studies includes Africa, Asia, Europe, and the Middle East, which again help reflect diversity. The methodologies of these researched studies are diverse as well such as systematic review, empirical studies, conceptual framework, case study, implementation, and exploratory analysis. The educational applications studied in the literature have included credential verification, credit transfer, diploma maintenance, sustainable learning, and AI-infused/non-formal learning experiences and systems. The articles related to governance highlight important themes as transparency, accountability, land administration, public sector reform, and identity management. Overall, the 25 selected studies offer a good breadth of knowledge regarding blockchain's practical applications, associated challenges, and emerging trends and literature for further thematic synthesis and analysis in the indicative next Results section.

Table 9. Bibliographic and Methodological Characteristics of Selected Blockchain Studies in Education and Governance

Authors & Year	Country / Region	Study Type	Methods Used
Alammary et al., 2019	Multiple / Global	Systematic Review	Literature synthesis, thematic analysis
Ameyaw & De Vries, 2020	Ghana	Conceptual / Framework	Four-dimensional framework analysis
Bhaskar et al., 2021	India	Conceptual Review	Literature survey, descriptive synthesis
Bucea-Manea-Ţoniş et al., 2021	Europe	Empirical	Case study, data analysis
Cagigas et al., 2021	Europe	Systematic Review	Database search, thematic coding

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Authors & Year	Country / Region	Study Type	Methods Used
Caramihai & Severin, 2023	Europe	Empirical	Implementation study, application analysis
Delgado-von-Eitzen et al., 2021	Europe	Systematic Review	Literature review, comparative analysis
El Koshiry et al., 2023	Egypt	Overview Study	Review of innovations, outcomes evaluation
Jayanthi et al., 2024	India	Explorative / Book Chapter	Qualitative analysis, case examples
Moura et al., 2020	Brazil	Systematic Review	Database search, synthesis
Mufron et al., 2024	Indonesia	Empirical	Strategy development, implementation analysis
Muhdiarta, 2025	Indonesia	Conceptual	Policy analysis, governance framework
Nazari et al., 2024	Iran	Conceptual Pilot	Model development, literature integration
Ocheja et al., 2022	Nigeria	Systematic Review	Literature synthesis, practical case studies
Park, 2021	South Korea	Conceptual	Challenges analysis, literature review
Pasaribu et al., 2024	Indonesia	Model Study	Governance model, simulation analysis
Raimundo & Rosário, 2021	Portugal	Empirical	Survey, case study
Skiba, 2017	USA	Commentary	Perspective, literature overview
Sung & Park, 2021	South Korea	Empirical	Adoption study, survey analysis
Tan et al., 2022	Belgium	Conceptual	Framework development, qualitative analysis
Turcu et al., 2019	Romania	Conceptual Preprint	Literature overview, conceptual modeling
Turkanović et al., 2018	Europe	Empirical	Implementation study, platform evaluation
Tyma et al., 2022	USA	Empirical / Conceptual	Accountability study, thematic synthesis

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Authors & Year	Country / Region	Study Type	Methods Used
Wang et al., 2024	China	Systematic Review	Database search, thematic coding
Yumna et al., 2019	Pakistan	Systematic Review	Literature synthesis, analysis

The 25 selected studies provide a comprehensive picture of blockchain adoption in education and governance across different geographical contexts, including Africa, Asia, Europe, North America, and the Middle East. Study types are varied, ranging from systematic reviews, empirical studies, conceptual models, implementation research, and preprints, and therefore an equilibrium between practice and theory. Methodologies employed include database searches, literature synthesis, thematic analysis, case studies, survey-based empirical research, framework and model development, and policy or governance analysis. For education-focused studies, methods noted included credential verification, credit transfer, diploma management, and learning systems for sustainable development with supporting empirical or pilot implementation analysis. The governance-focused studies employed frameworks to analyze transparency, accountability, land administration, identity management, and public service reform with conceptual modeling supported by empirical evaluation. Several studies blended emerging technologies like AI to support the application of blockchain. Such methodological diversity provides a strong foundation for synthesis of patterns, trends, and gaps, thereby justifying the possibility of a structured thematic synthesis in the Results chapter. It provides assurance that the review includes both practical application and theoretical implications, offering meaningful evidence for researchers, policymakers, and educational or administrative authorities to apply blockchain technologies effectively.

Table 10. *Applications of Blockchain in Educational Management Systems*

Study & Year	Application Focus	Key Findings / Insights
Caramihai & Severin, 2023	Diploma Management	Blockchain enables secure, tamper-proof storage and verification of diplomas, reducing fraud and administrative delays.
Turkanović et al., 2018	Credit Transfer	EduCTX platform demonstrates blockchain's ability to streamline credit transfer across institutions while maintaining transparency.
Bucea-Manea-Țoniş et al., 2021	Sustainable Education	Blockchain supports sustainable education by enhancing record integrity, accountability, and long-term access to academic credentials.
Bhaskar et al., 2021	General Education Management	Highlights potential for blockchain to improve administrative efficiency, record security, and trust in educational institutions.

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Study & Year	Application Focus	Key Findings / Insights
Delgado-von-Eitzen et al., 2021	Credential Verification	Systematic review confirms blockchain facilitates reliable credential verification, reducing reliance on centralized databases.
Ocheja et al., 2022	Case Studies / Education Systems	Practical implementations show blockchain improves transparency, interoperability, and auditability in student record management.
Wang et al., 2024	Solutions & Challenges	Blockchain-based solutions improve student record management, but scalability and adoption costs remain critical barriers.
Alammary et al., 2019	Systematic Overview	Blockchain provides secure, verifiable digital academic records, enhancing institutional trust and reducing fraudulent activities.

Blockchain technology has also emerged as an innovative device in education management systems with solutions for secure proof of credentials, effective credit transfer, and the encouragement of sustainable practice in education. Studies such as Caramihai & Severin (2023) demonstrate how blockchain makes diploma storage tamper-proof to guarantee authenticity and minimize false certifications. Platforms like EduCTX (Turkanović et al., 2018) recognize the potential for frictionless transfer of credits between institutions, improving administrative efficiency while making it transparent and auditable. Bucea-Manea-Ţoniş et al. (2021) report the importance of blockchain technology to sustainable learning, showing immutable ledgers enhance accountability, long-term retention of academic achievements, and institutional credibility.

Systematic reviews and quantitative research (Bhaskar et al., 2021; Delgado-von-Eitzen et al., 2021; Alammary et al., 2019) collectively demonstrate that blockchain increases the security of records, administrative processes, and trust for the involved parties, such as employers, institutions, and students. Case studies reviewed by Ocheja et al. (2022) also confirm real benefits, including interoperability between different education databases and increased transparency. Wang et al. (2024) recognize that although such advantages do exist, scalability, adoption costs, and technical challenges remain enormous issues.

Overall, the literature confirms that adopting blockchain in education management systems can efficiently improve the authentication of credentials, credit transfer processes, and education sustainability practices. These applications reduce reliance on centralized databases, minimize the chances of fraud, and enhance institutional trust, allowing the education system to be more transparent, efficient, and sustainable. The above conclusions provide a strong platform for education institutions to adopt blockchain-supported solutions.

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Table 11. Applications of Blockchain in Public Administration and Governance

Study & Year	Application Focus	Key Findings / Insights
Ameyaw & De Vries, 2020	Land Administration Transparency	Blockchain provides immutable land records, enhancing transparency, reducing fraud, and supporting equitable land management.
Muhdiarta, 2025	Accountability Frameworks	Blockchain strengthens accountability mechanisms in public administration by creating tamper-proof records of decision-making and resource allocation.
Moura et al., 2020	Public Service Reform	Implementation of blockchain improves efficiency, trust, and traceability in public services, supporting modernization of administrative processes.
Tan et al., 2022	Governance Frameworks	Conceptual frameworks demonstrate blockchain's potential for enhancing transparency and structured governance in public institutions.
Sung & Park, 2021	Identity Management	Blockchain enables secure, verifiable citizen identity management, reducing administrative errors and enhancing service delivery.
Jayanthi et al., 2024	AI and Blockchain Integration	Integration with AI improves decision-making, predictive governance, and data accountability in administrative processes.
Pasaribu et al., 2024	Transparent Public Administration	Blockchain-based models facilitate open governance, enabling auditability and citizen participation in administrative systems.
Tyma et al., 2022	Accountability Systems	Empirical and conceptual analysis highlights blockchain's role in improving transparency, reporting, and compliance in public institutions.

Blockchain technology has shown high potential in transforming public administration and governance through increased transparency, accountability, land administration, and public service delivery. Ameyaw & De Vries (2020) mention the use of immutable blockchain records in land administration, which reduce fraud, improve property rights, and ensure fair transactions. Muhdiarta (2025) also mentions the ability of blockchain to enhance systems of accountability by maintaining tamper-proof records of administrative decisions and financial obligations, following good governance practices.

Public service reform is another critical area in which blockchain provides measurable benefits. Moura et al. (2020) explain how blockchain can transform service processes into efficient ones, improve traceability, and foster trust between the state and citizens. Conceptual studies, such as Tan et al. (2022), offer governance models that leverage blockchain to improve institutional transparency and structure. Blockchain further supports secure management of identities, reducing administrative errors and increasing the efficiency of services (Sung & Park, 2021).

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Emerging research identifies the integration of blockchain with AI for predictive governance, enhanced decision-making, and accountability in data (Jayanthi et al., 2024). Decentralized administrative systems (Pasaribu et al., 2024) increase participation of the people and auditability, resulting in public transparency and accountability systems. Tyma et al. (2022) also confirm that blockchain improves reporting, compliance, and monitoring in public organizations.

Collectively, these works reveal that blockchain can transform public administration since it offers secure, transparent, and effective governance processes, accountability, and delivery of services. While there are challenges posed by the adoption and integration of technology, literature is strongly supportive of blockchain as a leading enabler of up-to-date, trustworthy, and citizen-centered governance.

Table 12. Challenges and Barriers in Blockchain Implementation for Education and Public Administration

Study & Year	Challenge / Barrier	Key Findings / Insights
Park, 2021	Scalability	Blockchain networks face scalability issues, limiting the number of transactions and participants that can be efficiently processed.
Wang et al., 2024	Cost	High implementation and maintenance costs deter widespread adoption in educational and governmental institutions.
Sung & Park, 2021	Privacy	Handling sensitive data on immutable ledgers raises privacy concerns, particularly for citizen and student information.
Pasaribu et al., 2024	Technical Complexity	Complex system design and integration challenges make deployment difficult for organizations with limited technical capacity.
Bucea-Manea-Țoniș et al., 2021	Resistance to Adoption	Organizational culture, lack of awareness, and fear of change create resistance among stakeholders.
Tyma et al., 2022	Governance & Policy Barriers	Inconsistent regulations and unclear governance frameworks hinder blockchain adoption in public administration.
El Koshiry et al., 2023	Interoperability	Difficulty in integrating blockchain with existing legacy systems reduces usability and system effectiveness.
Turcu et al., 2019	Knowledge Gap	Limited expertise and technical knowledge among practitioner's slow implementation and innovation.

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Though its revolutionary scope, however, blockchain implementation within public administration and education is faced with various robust challenges and obstacles. One of these is scalability, as noted by Park (2021), since current blockchain networks can be challenged to scale with an immense number of transactions at a time, which could limit deployment in large organizations. Implementation and operating costs are another overarching challenge (Wang et al., 2024), with significant infrastructure and maintenance costs constraining adoption, particularly in resource-constrained environments.

Privacy and data protection are also issues. Sung & Park (2021) mention that storing sensitive student or citizen information on immutable ledgers raises ethical and legal issues that have to be resolved by suitable encryption and compliance with data protection legislation. Technical sophistication and interoperability are also adoption barriers (Pasaribu et al., 2024; El Koshiry et al., 2023), as blockchain networks have to integrate with existing administrative infrastructures accompanied by legacy systems and weak technical capacity.

Organizational resistance also exists; stakeholders may resist the implementation of new technologies due to unfamiliarity with them, change resistance, or ignorance of the benefits of blockchain (Bucea-Manea-Țoniș et al., 2021). Governance and policy barriers (Tyma et al., 2022) pose another challenge since conflicting regulations, unclear standards, and poor government incentives obstruct adoption. Finally, a knowledge gap (Turcu et al., 2019) among practitioners and administrators restricts successful deployment and innovation.

Table 13. Overcoming Blockchain Adoption Challenges in Education and Public Administration

Challenge	Practical Solutions	Supporting References
Scalability	Layer-2 solutions, hybrid on/off-chain processing	Al-Breiki et al., 2020; Xu et al., 2021
Interoperability	APIs, middleware for system integration	Casino et al., 2019
Privacy & Security	Permissioned blockchains, ZKPs, homomorphic encryption	Zyskind & Nathan, 2015; Wang et al., 2019
Regulatory Gaps	National governance frameworks, compliance guidelines	Furlonger & Uzureau, 2019
Institutional Readiness	Capacity building, IT infrastructure, managerial support, training	Kamble et al., 2019; Queiroz & Wamba, 2019; Pournader et al., 2020

The findings presented in Table 13 show that issues associated with blockchain adoption in education and public administration can be approached practically and with consideration of the evidence. Some scalability challenges can be addressed as different kinds of layer-2 solutions and/or on-chain/off-chain approaches are more widely utilized (Al-Breiki et al.,2020; Xu et al., 2021). Interoperability issues may be addressed, at least in part, by using standard APIs and/or middleware solutions, which should also help to enhance existing systems

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(Casino et al., 2019). Privacy and security issues can potentially be addressed by employing permissioned blockchains, zero-knowledge proofs, and/or homomorphic encryption to satisfy both data privacy and transparency (Zyskind & Nathan, 2015; Wang et al., 2019)For regulatory issues that are less directly related to governance structures for blockchain systems, our emphasis should be on addressing these gaps with clear governance structures and compliance measures in order to support accountability (Furlonger & Uzureau, 2019). Finally, institutional readiness, including issues related to technical infrastructures, managerial, and capacity building, should continue to be a central concern to the larger framework (Kamble et al., 2019; Queiroz & Wamba, 2019; Pournader et al., 2020).

Thematic Synthesis and Comparative Insights

Thematic synthesis of the literature for review points to distinguishing yet integrated tendencies within blockchain applications in educational management systems and public administration. Three overarching themes applications in education, governance and public administration, and challenges are found to be necessary through which to view blockchain adoption. In education management systems, blockchain constantly enhances credential verification, credit transfer, and sustainable learning, ensuring irrevocable records, auditability, and administrative efficiency (Caramihai & Severin, 2023; Turkanović et al., 2018; Bucea-Manea-Ţoniş et al., 2021). Similarly, in government, blockchain improves land administration, public service reform, transparency, and accountability through providing tamper-proof ledgers and secure identity management that improve institutional trust and citizen engagement (Ameyaw & De Vries, 2020; Muhdiarta, 2025; Tan et al., 2022).

Comparative analysis reveals significant similarities: both sectors employ blockchain's inherent characteristics immutability, traceability, and decentralization to enhance trust, reduce fraud, and facilitate transparency. The obstacles to adoption differ, however: education-focused applications primarily face administrative inertia and compatibility with existing academic infrastructure as obstacles, whereas public administration faces regulatory uncertainty, policy constraints, and more encompassing governance challenges (Park, 2021; Tyma et al., 2022).

Emerging trends highlight cross-domain synergies, such as blockchain converging with AI to yield predictive governance and adaptive learning systems (Jayanthi et al., 2024; Nazari et al., 2024). Additionally, interoperability enabled by blockchain, and decentralized models are on the horizon to bridge institutional silos to yield more harmonized and transparent operations. In summary, this synthesis highlights that even though applications in a domain are variegated in scope and context, the underlying philosophy of blockchain provides scalable solutions to systemic inefficiency, providing a platform for future cross-disciplinary research and pragmatic deployment pathways.

DISCUSSION

This systematic review brought together the evidence from 25 studies between 2017 and 2025 that examined the application of blockchain in educational management systems and public administration in various global contexts, such as Africa, Asia, Europe, North America, and the Middle East. Studies in the field of education always pointed out the blockchain for areas of credential verification, credit payment, diploma management, and environmentally friendly learning systems, mainly in conjunction with AI-driven non-formal learning platforms (Alammary et al., 2019; Bhaskar et al., 2021; Bucea-Manea-Ţoniş et al., 2021; Nazari et al.,

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2024). In this arena, EduCTX blockchain platform stands as an example of a blockchain solution that is meant to facilitate and provide the possibility for the credit transfer to be undertaken anywhere, while affording administrative conveniences along with data integrity (Turkanović et al., 2018; Caramihai & Severin, 2023). Systematic reviews and empirical studies (Delgado-von-Eitzen et al., 2021; Ocheja et al., 2022; Wang et al., 2024) argue that blockchains reduce dependency on centrally maintained databases, create an audit trail, and address any issues of institutional distrust between students, educators, and employers. These barriers, therefore, include issues with scaling, cost, and technical challenges (Park, 2021; Wang et al., 2024).

In public administration, blockchain has been highly regarded as a technology with immense potential to improve transparency and accountability, land administration, identity management, and public service delivery. Immortal ledgers offer uncorrupt land records to prevent any fraudulent land claims and justifiable property rights (Ameyaw & De Vries, 2020). Blockchain also boosts accountability mechanisms by maintaining tamper-proof records of administrative activities and resource distribution (Muhdiarta, 2025; Tyma et al., 2022). Alignment with AI facilitates predictive governance, data-based decision-making, and efficient delivery of public services (Jayanthi et al., 2024). Conceptual models and decentralized systems (Tan et al., 2022; Pasaribu et al., 2024) demonstrate blockchain's capability to facilitate citizen engagement, auditability, and open governance.At present, obstacles to adoption are slowed by the ambiguity of regulations and policies, restrictions, interoperability, and technicality specific requirements for organizational readiness and policy consistency (Sung & Park, 2021; El Koshiry et al., 2023).The comparisons indicate that applications in learning and governance compete mainly for use, centering on underlying properties of blockchain-immutability, traceability, and decentralization-in fostering trust, fraud detection, and transparency in transactions. There are a number of issues faced by the educational system, while public administration must manage policy and regulatory issues. Trends across fields-integration of AI and blockchain-should be the subject of potential practices of adaptive learning platforms and predictive governance and areas of interdisciplinary inquiry (Jayanthi et al., 2024; Nazari, et al., 2024).

Implications of the study

The results emphasize the importance of blockchain and its strategic value for education and governance. In education, organizations can: reduce burdensome administrative tasks, guarantee safe, verifiable, and digital academic records, and enhance student trust in institutions. With respect to public administration, blockchain can: improve transparency, strengthen accountability, and improve citizen engagement, contributing to governance outcomes. Policymakers should consider developing regulatory frameworks, interoperability standards, and capacity-building endeavors to mitigate conditions preventing adoption. Practitioners must consider investing in the technical infrastructure needed for digital education while also laying the groundwork with training initiatives and awareness raising campaigns to facilitate sustainable deployment. Cross-sector collaborations that have integrated blockchain into existing systems/processes in conjunction with emerging technologies such as AI can further support better decision-making, efficiency, and quality of service provision, and the socio-technical benefits of such activities are of considerable benefit to society.

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CONCLUSION

The review suggests blockchain could provide its real-world use case in the education industry and public administration for various services around the world. Education has seen impacts of blockchain in its institutions through uses like credential verification, credit transfer, diploma management, or sustainable learning systems for example, with support for transparency, interoperability, and efficiencies in institutional administration. Some examples of blockchains like EduCTX and even some initial empirical pilot studies suggest blockchain can diminish reliance on centralized databases, safely store student credentials and other authentication, and enhance trust among institutions. In taking this to the land administration, blockchain affords for transparent land administration, accountable governance, secure identity management, and efficient delivery of public service; all with implications for better citizen engagement and trust in institutions.

These reviews describe the most common barriers that could hinder adoption. These include administrative resistance, compatibility with existing systems, and technological capacity with education, whereas in public administration, regulation ambivalence, system limitations, and technical capacity may further affect the adoption process. Nonetheless, emerging trends in their most recognizable form, AI paired with blockchain, serve as examples of some great innovation in cross-domain synergy that can support and advance decision-making, predictive governance, and adaptive learning platforms. The scholarship continues to note that blockchain's key feature, assignment, or code, built by immutability, traceability, and decentralization is essential in building trust, confidence, operational integrity, and transparency in both sectors.

Collectively, the evidence suggests that the application of blockchain can bring significant socio-technical benefits in the form of improving institutional function, reducing fraud, and stakeholders' trust. Effective deployment, however, requires technical, regulatory, and organizational factors to be taken into account and investment in training and capacity-building initiatives. The review offers a sound foundation for guiding future research and practical deployment strategies to leverage the potential of blockchain to transform education and public administrative systems.

Recommendations and Practical Implications

To encourage appropriate use of blockchain in education and public sector, government organizations and institutions need to enact action plans that address technology and organization-related challenges. Thus, policy makers should follow a transparent procedure to develop regulatory frameworks that articulate expectations for data privacy, data security and interoperability concerns to ensure compliance to trusted protocols. To assist with adoption, governments should support pilot projects in higher education and public service contexts in order for institutions to have opportunities to trial blockchain projects particularly related to credentialing verification, governance transparency and digital records. At the institutional level, capacity building initiatives (e.g., training for staff, increasing digital literacy) are often important measures to facilitate the mitigating resistance to technology implementation. Finally, investment in IT infrastructure, or in developing hybrid solutions relative to blockchain, can also consider scalability without sacrificing quality and performance. Collaborative partnerships between government, universities and industry will also provide support for innovative practice as well as best practice sharing. Together, government

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endeavors and institutional practice can change the blockchain technology experiment from theoretical to practical transformation for governance and education.

Future Research

Future studies should explore blockchain-AI integration, cross-border educational platforms, and governance models to enhance transparency, interoperability, and decision-making efficiency.

REFERENCES

Alammary, A., Alhazmi, S., Almasri, M., & Gillani, S. (2019). Blockchain-based applications in education: A systematic review. *Applied Sciences*, *9*(12), 2400. https://doi.org/10.3390/app9122400

Ameyaw, P. D., & De Vries, W. T. (2020). Transparency of land administration and the role of blockchain technology, a four-dimensional framework analysis from the Ghanaian land perspective. *Land*, *9*(12), 491. https://doi.org/10.3390/land9120491

Bhaskar, P., Tiwari, C. K., & Joshi, A. (2021). Blockchain in education management: present and future applications. *Interactive Technology and Smart Education*, *18*(1), 1-17. https://doi.org/10.1108/ITSE-07-2020-0102

Bucea-Manea-Țoniș, R., Martins, O. M., Bucea-Manea-Țoniș, R., Gheorghiță, C., Kuleto, V., Ilić, M. P., & Simion, V. E. (2021). Blockchain technology enhances sustainable higher education. *Sustainability*, *13*(22), 12347. https://doi.org/10.3390/su132212347

Cagigas, D., Clifton, J., Diaz-Fuentes, D., & Fernández-Gutiérrez, M. (2021). Blockchain for public services: A systematic literature review. *IEEE access*, *9*, 13904-13921. https://doi.org/10.1109/ACCESS.2021.3052019

Caramihai, M., & Severin, I. (2023). A blockchain-based solution for diploma management in universities. Sustainability, 15(20), 15169. https://doi.org/10.3390/su152015169

Delgado-von-Eitzen, C., Anido-Rifón, L., & Fernández-Iglesias, M. J. (2021). Blockchain applications in education: A systematic literature review. *Applied Sciences*, *11*(24), 11811. https://doi.org/10.3390/app112411811

El Koshiry, A., Eliwa, E., Abd El-Hafeez, T., & Shams, M. Y. (2023). Unlocking the power of blockchain in education: An overview of innovations and outcomes. *Blockchain: Research and Applications*, *4*(4), 100165. https://doi.org/10.1016/j.bcra.2023.100165

Jayanthi, S., Kumar, N. S., Balashivudu, U., Purushotham, M., & Jeeva, S. (2024). An explorative study of explainable AI and blockchain integration in public administration. In *Applications of Blockchain and Artificial Intelligence in Finance and Governance* (pp. 230-271). CRC Press. https://www.taylorfrancis.com/chapters/edit/10.1201/9781003518365-10/

Moura, L. M. F. D., Brauner, D. F., & Janissek-Muniz, R. (2020). Blockchain and a technological perspective for public administration: A systematic review. *Revista de Administração Contemporânea*, *24*, 259-274. https://doi.org/10.1590/1982-7849rac2020190171

Mufron, A., Najoan, M. E., & Utomo, B. (2024). Strategy for implementing blockchain technology in higher education administrative management. *International Journal of Educational Narratives*, *2*(2), 249-258. https://doi.org/10.70177/ijen.v2i2.1058

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Muhdiarta, U. (2025). Blockchain Technology for Public Administration: Enhancing Accountability and Good Governance. *International Journal of Innovation and Thinking*, *2*(1), 39-50. https://doi.org/10.71364/ijit.v2i1.9

Nazari, Z., Vahidi, A. R., & Musilek, P. (2024). Blockchain and artificial intelligence non-formal education system (BANFES). *Education Sciences*, *14*(8), 881. https://doi.org/10.3390/educsci14080881

Ocheja, P., Agbo, F. J., Oyelere, S. S., Flanagan, B., & Ogata, H. (2022). Blockchain in education: A systematic review and practical case studies. *IEEE Access*, *10*, 99525-99540. https://doi.org/10.1109/ACCESS.2022.3206791

Park, J. Promises and challenges of Blockchain in education. *Smart Learn. Environ.* **8**, 33 (2021). https://doi.org/10.1186/s40561-021-00179-2

Pasaribu, H., Widiatmoko, A., & Supriyanto, D. (2024). Decentralized educational administration: A blockchain model for transparent governance. *Journal of Social Science Utilizing Technology*, *2*(3), 386-399. https://doi.org/10.70177/jssut.v2i3.1343

Raimundo, R., & Rosário, A. (2021). Blockchain system in the higher education. *European Journal of Investigation in Health, Psychology and Education*, *11*(1), 276-293. https://doi.org/10.3390/ejihpe11010021

Skiba, D. J. (2017). The potential of blockchain in education and health care. *Nursing education perspectives*, *38*(4), 220-221. https://doi.org/10.1097/01.NEP.0000000000000190

Sung, C. S., & Park, J. Y. (2021). Understanding of blockchain-based identity management system adoption in the public sector. Journal of Enterprise Information Management, 34(5), 1481-1505. https://doi.org/10.1108/JEIM-12-2020-0532

Tan, E., Mahula, S., & Crompvoets, J. (2022). Blockchain governance in the public sector: A conceptual framework for public management. *Government Information Quarterly*, *39*(1), 101625. https://doi.org/10.1016/j.giq.2021.101625

Turcu, C., Turcu, C., & Chiuchisan, I. (2019). Blockchain and its Potential in Education. *arXiv preprint arXiv:1903.09300*. https://doi.org/10.48550/arXiv.1903.09300

Turkanović, M., Hölbl, M., Košič, K., Heričko, M., & Kamišalić, A. (2018). EduCTX: A blockchain-based higher education credit platform. *IEEE access*, *6*, 5112-5127. https://doi.org/10.1109/ACCESS.2018.2789929

Tyma, B., Dhillon, R., Sivabalan, P., & Wieder, B. (2022). Understanding accountability in blockchain systems. *Accounting, Auditing & Accountability Journal*, *35*(7), 1625-1655. https://doi.org/10.1108/AAAJ-07-2020-4713

Wang, X., Younas, M., Jiang, Y., Imran, M., & Almusharraf, N. (2024). A Systematic Review on Blockchain in Education: Solutions and Challenges. *IEEE Access*. https://doi.org/10.1109/ACCESS.2024.3519350

Yumna, H., Khan, M.M., Ikram, M., Ilyas, S. (2019). Use of Blockchain in Education: A Systematic Literature Review. In: Nguyen, N., Gaol, F., Hong, TP., Trawiński, B. (eds) Intelligent Information and Database Systems. ACIIDS 2019. Lecture Notes in Computer Science (), vol 11432. Springer, Cham. https://doi.org/10.1007/978-3-030-14802-7_17

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