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Challenges to Indian Knowledge System During Curriculum Framework for Blockchain and the Metaverse

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Abstract: The integration of the Indian knowledge system into the curriculum framework for emerging technologies like blockchain and the Metaverse presents both opportunities and challenges. This paper explores the challenges encountered in incorporating traditional Indian knowledge into educational programs focused on cutting-edge digital innovations. Drawing from a review of literature and discussions with experts, the paper identifies key obstacles such as the technical complexity of modern technologies, the need for cultural sensitivity and authenticity, resistance to change within traditional educational systems, and disparities in access to resources and technology. Additionally, it examines the interdisciplinary nature of integrating Indian knowledge systems with technical subjects and the implications for curriculum design, assessment methods, and teacher training. By addressing these challenges, educators and policymakers can create a curriculum framework that effectively integrates Indian knowledge systems with education on blockchain and the Metaverse, preparing students for the future while preserving and celebrating India's rich cultural heritage.

Keyword: Indian knowledge system, curriculum framework, Blockchain, Metaverse

1. Introduction

The National Council of Educational Research and Training (NCERT) created India's National Curriculum Framework (NCF). It guides national school curriculum, textbooks, and teaching methods. The Curriculum Framework for National Education Policy (NCF) emphasizes various areas of the Indian knowledge system:

[1] Inclusion and Diversity: The NCF promotes multiple views and knowledge systems, including indigenous knowledge, throughout the curriculum. Students should learn about India's rich cultural legacy and diversity.

[2] Traditional and contemporary Knowledge Integration: The framework emphasizes combining traditional and contemporary knowledge systems into education. Indigenous knowledge, such as traditional medicine, agriculture, and local crafts, is taught alongside modern courses.

[3] Indian Philosophical Thought: The NCF promotes Indian philosophy in the curriculum. This comprises Vedic, Upanishad, Bhagavad Gita, and Swami Vivekananda and Mahatma Gandhi teachings.

[4] Cultural Heritage: The curriculum framework emphasizes on Indian literature, art, music, dance, and architecture. Students learn to appreciate their culture and identity.
[5] Environmental Sustainability: Traditional Indian wisdom emphasizes eco-friendly lifestyle. Using traditional ecological knowledge, the NCF promotes environmental education and sustainability throughout the curriculum.
[6] Skills and Values: The NCF promotes empathy, compassion, integrity, and social responsibility together with academic knowledge. Traditional Indian ideals and ethics shape the curriculum's value system.
[7] Language and Linguistic Diversity: The NCF encourages multilingual education in India. The program promotes regional languages and dialects as well as English and Hindi.

The Curriculum Framework for National Education Policy in India draws on India's rich knowledge traditions to establish a comprehensive and inclusive education system that fosters students' intellectual, emotional, ethical, and cultural growth.

2. Integrating elements of the Indian knowledge system into a curriculum framework for blockchain and the Metaverse

Integrating elements of the Indian knowledge system into a curriculum framework for blockchain and the Metaverse can provide students with a deeper understanding of the cultural context and ethical considerations surrounding these emerging technologies. Here are some ways this integration could be approached:

[1] Historical Context: Drawing parallels between ancient Indian mathematical and philosophical concepts and modern blockchain technology can help students grasp the foundational principles. References to texts like the Vedas or the concept of zero in Indian mathematics can illustrate the evolution of mathematical thought and its relevance to cryptography and decentralized systems.
[2] Philosophical Perspectives: Exploring Indian philosophical concepts such as dharma (duty), karma (action), and moksha (liberation) can prompt discussions on the ethical implications of blockchain technology and the Metaverse. Concepts like decentralization, digital identity, and ownership can be examined through the lens of Indian ethical frameworks.
[3] Cultural Applications: Incorporating examples of Indian cultural heritage and art into discussions on the Metaverse can demonstrate the potential for cultural expression and preservation in virtual environments. Students can explore how traditional Indian art forms, architecture, and mythology are being represented and adapted in digital spaces.
[4] Environmental Sustainability: Emphasizing the importance of environmental sustainability in blockchain and Metaverse development aligns with traditional Indian values of ecological balance. Educating students about the environmental impact of digital technologies and exploring sustainable practices in virtual world design can be part of the curriculum.
[5] Local Case Studies: Highlighting blockchain and Metaverse projects or initiatives with connections to India can provide students with insights into real-world applications and challenges. Case studies could include projects focused on land ownership records, digital identity, or virtual education platforms tailored to Indian contexts.

[6] Language and Linguistic Diversity: Recognizing the linguistic diversity of India by offering educational materials and resources in regional languages can enhance accessibility and inclusivity in blockchain and Metaverse education initiatives. Language localization can make complex concepts more understandable and relatable for students from diverse linguistic backgrounds.

[7] Interdisciplinary Approach: Encouraging interdisciplinary learning by integrating concepts from Indian history, philosophy, literature, and art with technical aspects of blockchain and the Metaverse can foster creativity and critical thinking skills. Collaborative projects that combine technical development with cultural interpretation can provide hands-on learning experiences for students.

By integrating elements of the Indian knowledge system into the curriculum framework for blockchain and the Metaverse, educators can provide students with a comprehensive understanding of these technologies while fostering cultural appreciation and ethical awareness. This approach can help prepare students to navigate the opportunities and challenges of an increasingly interconnected and digital world.

3. Literature review

This section discusses blockchain, metaverse smart contract, and NFT research. A. Singla et al. (2023) studied deep learning for NFT photo categorization. CNN is used after increasing the categorization issue. Noise reduction and image compression are added by this addition. Photo compression and noise reduction follow dataset splitting. It increases visual quality and decreases artifacts. CNNs train and assess models using preprocessed pictures. This approach eliminates noise to improve model image feature identification. The test set assesses the model's NFT image identification after compression and noise reduction [1].

R. Gupta et al. (2023) explained how Pancake Swap and Icecream Swap establish liquidity pools. NFT currencies METANFT and 9NFTMANIA were examined. DeFi ecosystems need liquidity pools to stabilize token values. Arbitrage is one method liquidity pools improve stability. Investors purchase inexpensive tokens. It sells better when pricey. Decentralized exchanges provide arbitrage due to liquidity pools. Arbitrageurs stabilize the token's value by pegging it. In addition, token supply and demand substantially impact liquidity pools. Buyers trade stablecoins for other assets as demand rises, enhancing its price. Demand for stablecoins diminishes as purchasers buy other assets. Liquidity pools automatically adjust asset composition to market conditions. The token's value stays stable despite supply and demand variations due to the liquidity pool's responsiveness [2].

A. Duggal et al. (2023) explored how NFT avatars affect metaverse digital ownership, self-expression, and user engagement. The research also analyzes NFT avatar promotion issues. Market dynamics, technological hurdles, and customer acceptability are explored. It analyzes various NFTs from NFT Brands. This NFT may help the Metaverse shortly. The article ends with a "Sizzling monster" NFT case study. Supply is limited since several NFT businesses bought it via the Young Parrot Platform. describes how NFT avatars are transforming metaverse digital ownership, user involvement, and self-expression. The research also analyzes NFT avatar promotion issues. Market dynamics, technological hurdles, and customer acceptability are explored. It analyzes various NFTs from NFT Brands. This NFT may help the Metaverse shortly. The article ends with a "Sizzling monster" NFT case study. Supply is limited since several NFT businesses

bought it via the Young Parrot Platform. With NFT avatars, the metaverse has altered drastically [3]. Avatars provide unique, marketable digital identities.

Issalh, R., et al. (2023) promoted cryptocurrencies and mining. Pi Network uses Stellar Consensus Protocol for blockchain. This blockchain values speed, decentralization, and security. Pi Network emphasizes community early on. The firm wants to encourage project involvement and engagement. Bitcoin users and aficionados must remain current on Pi Network ecosystem news since the bitcoin business changes. Risks and regulations should be considered before starting a cryptocurrency venture [4].

It was Gupta. 2023 required caution, prudence, and ethical investing. These ideas may help blockchain technology overcome market volatility by making the ecosystem more resilient and stable. When trading NFTs (Non-Fungible Tokens), cryptocurrency traders must be cautious and aware. Known cryptocurrency market volatility, NFT volatility is heightened. Since price changes may be sudden and unexpected, investors should avoid speculation. NFTs' value depends on demand, cultural significance, and scarcity. Research has no inherent value, therefore investors struggle to decide. Historical pricing data may be lacking due to the cryptocurrency industry's rapid growth [5].

This complicates non-fungible token valuation. Singla, A., et al. (2023) highlighted that investors, miners, and enthusiasts eagerly anticipate Bitcoin halvings. Examine how these halving events affect supply dynamics, market sentiment, and the crypto ecosystem to determine how they affect them. Bitcoin halving may effect market dynamics and investor sentiment but not the metaverse or NFTs. Bitcoin, the biggest cryptocurrency, and the cryptocurrency market effect NFTs, the metaverse, and other cryptocurrencies. Bitcoin block rewards decrease when half, encouraging cryptocurrency speculation. Crypto assets like NFT and metaverse assets may profit from this favorable outlook [6].

According to Gupta, M., et al. (2023), many creative individuals make great products but don't obtain worldwide exposure. When promoting and selling their works, these artists will reach a tiny audience. Premium clients are rare in distant areas. Rural artists are neglected. These artists can only sell internationally via NFT. Blockchain has increased NFT marketing and diffusion. Thus, Opensea and Young Parrot may create NFTs on Matic, Satoshi core, Ethereum, and BNB smart chains. 9NFTMANIA created NFT lifestyle. NFTs are used for greetings, invitations, certificates, and membership cards in this culture. This non-fungible token is useful since it can help transfer digital assets privately. Not only to say thanks or hello, anybody may transfer NFT to another's wallet. Since few NFTs welcome newcomers, prices may climb. Web 3.0 will verify Metaverse NFT holders and provide them premium internet services [7].

Gupta M. generated 2023 blockchain contract addresses to tokenize user IDs. Users get an NFT or 9NM token as a digital identity to avoid cryptographic key manipulation. Blockchain smart contracts authenticate and manage access. User contract discusses set rules. This research reveals that Internet of Things user authentication standards need industry collaboration. Contract address-based NFTs and 9NM tokens on a Satoshi core blockchain are used to authenticate IoT users in this research. This initiative promotes secure and user-centric IoT in a fast-changing environment. Internet of Things network security and open and interoperable authentication are improved by the design. This research examined web 3.0 user authentication systems using Javascript, Python, ASP.NET, and PHP [8].

This study assumes smart contracts exist in wallets.

Gupta, D., et al. (2023) evaluate common platforms and NFT script technologies. Fundamental blockchain and Polygon Matic are their emphasis. In this article, scripting languages and smart contract features from popular NFTs are examined. Polygon Matic and the blockchain core are used to study scripting, interoperability, and NFT industry standards. According to the research, layer-2 scaling solution Polygon Matic may help core blockchain scale. The study also evaluates blockchain energy efficiency and NFT scripting's environmental effect. This is done first. As non-fungible tokens (NFTs) shift digital ownership, producers, collectors, and scholars must understand blockchain and Polygon Matic scripts. This study uncovers global NFT scripting complexities, trends, and sustainable practises [9].

Gupta, I., et al. (2023) say blockchain threatens centralized data management. These tools empower individuals to manage their data. Blockchain's immutability and durability make financial transactions more trustworthy and uncorruptible. Decentralized technologies are expanding beyond banking. Changes in corporate structures give people more economic power. Decentralized technology must overcome government restraints and user education to become widespread. Even if this integration offers significant benefits. Blockchain-based decentralization could aid numerous industries. Blockchain's security, decentralization, and openness may boost finance sector inclusion. Blockchain might allow worldwide peer-to-peer transactions without banks. This would lower transaction costs and expand financial access, particularly for the poor without or with inadequate bank accounts. Smart contracts, code-governed agreements that execute themselves, may automate complex financial processes without centralized authority. DAOs may democratize decision-making and change governance. More investors and global inventiveness may result from decentralized funding systems [10].

Issalh, R., et al. (2023) enhanced comprehension. The Researchers Economy values these pioneering ideas and implementers. 9NFTMANIA created the Researcher Economy blockchain and cryptocurrency concept. 9NFTMANIA helps ecologists study. They study and produce crypto currencies, NFTs, and customizable tokens. Our objective is to build a robust research community to increase digital asset value. 9NFTMANIA launched the Researcher Economy to honor outstanding research. A knowledge portal, simplified research publishing, and incentives to find and promote digital asset researchers are being developed by the 9NFTMANIA. The curriculum includes all of them. 9NFTMANIA aspires to establish a world where tokens, non-fungible tokens (NFTs), and crypto currencies are regularly and fully investigated to increase our knowledge of their worth by providing academics with resources. Metaverse scholars may profit from this initiative [11].

Kumar et al. (2024) recommended IoT and Blockchain for digital record authenticity, transparency, and security. Integrating IoT data collecting devices with blockchain technology increases digital ecosystem trust and transparency. Blockchain allows secure, decentralized, tamper-proof recordkeeping. Networked IoT devices capture real-time data. This information and digital documents provide a comprehensive and accurate record. Blockchain's immutable, decentralized ledger ensures digital record recording and validity. Blockchain and IoT solve data integrity, transparency, and security challenges individually and together. This study analyzes how IoT and Blockchain can protect financial, healthcare, and supply chain digital data. This additional step improves traceability, reduces fraud, and assures digital record reliability in trust-critical situations, according to case studies and application cases. Scalability, interoperability, and regulatory compliance are discussed in the article. Building a secure Internet of Things and Blockchain

architecture requires understanding these difficulties. As companies digitize, digital document protection becomes more crucial. This article suggests that IoT and blockchain technology might create an open, trustworthy, and secure digital record-keeping infrastructure. Organizations may safely traverse the digital realm and safeguard data by adopting this complementary paradigm [12].

Reddy, K. R., et al. (2024) suggested automating and optimizing blockchain integration. Scalability and interoperability are addressed by this method. IoT, big data analytics, and blockchain have created a dynamic ecosystem that allows decentralized systems to adapt to industry needs and expand organically using real-world data. Three technologies work together to produce a dynamic environment. This big data analytics research automates blockchain adoption by considering total supply, brand, stacking cost, and royalty. Improve efficiency. Blockchain technology, big data analytics, and the IoT are creating a new paradigm to automate and optimize blockchain adaptation. Big data analytics from the Internet of Things lets businesses quickly integrate and analyze vast volumes of data from connected devices. Data volume enables real-world process analysis. This enhances decision-making and discovers blockchain's potential uses. Internet of Things devices safely and transparently store data, which is the foundation of blockchain technology. Advanced analytics can identify data anomalies, trends, and patterns. The findings inform use case-specific smart contracts and DApps [13].

Jangra wrote. 2023 wants to review the literature on a new transdisciplinary area that employs deep learning to study Bitcoin. Deep learning models applied in finance include convolutional neural networks, recurrent neural networks, deep belief networks, and deep reinforcement learning. We'll start with these models. We also examine the most notable cryptocurrencies and their history to provide a cryptocurrency overview. Our bitcoin deep learning literature review includes numerous modeling exercises. These modeling difficulties include price prediction, portfolio development, bubble identification, and anomalous trading. Also mentioned are bitcoin trading and ICO laws. Modeling, empirical data, experimental results, and innovations are used to examine the study. We offer bitcoin industry deep learning research areas to finish our literature review [14].

Zhang et al. (2022) examined CryptoPunks' ethical difficulties, the NFT market's most popular collection. Design, trade, and Twitter topics were analyzed for ethical issues. We scraped Dune Analytics and Twitter data using sentiment analysis, Twitter crawlers, and Python packages. Our five visualizations demonstrate 1.6 times more male punks than female punks in design. In general, guys and lighter-skinned punks sell for more. This analysis and visualizations provide a basic knowledge of CryptoPunks, which may inspire further research on morally dubious non-fungible tokens. Recently popular blockchain software is Non-Fungible Token (NFT). Most blockchain NFTs are digital art. Despite the non-fiction book industry's rapid expansion, book artwork may raise ethical and racial justice concerns [15].

K. R. Reddy et al. (2024) proposed an Internet of Things-based blockchain smart contract trustworthiness assessment. IoT networks use real-world data to build a responsive and dynamic ecosystem on the blockchain. The proposed approach uses IoT data to compare smart contract execution outcomes to real-world scenarios. Next, the data will be analyzed for smart contract-business logic match. A grading mechanism to quantify smart contract execution validity, a decentralized network of IoT sensors, and data oracles to connect the digital and physical worlds are major components of the proposed system. Machine learning algorithms may identify discrepancies in prior data to improve smart contract validity. We evaluate

data integrity, transaction speed, and smart contract outcomes against real-world events. The solution provides users and stakeholders with an honest, up-to-date smart contract accuracy evaluation to improve blockchain transaction reliability. Blockchain technology operational efficiency and dependability are improved by this research. The Internet of Things-based grading system may help companies validate blockchain smart contracts. Smart contract deployment in blockchain-dependent industries including healthcare, supply chain management, and finance may be affected. In this research, blockchain technology user interaction was considered while developing digital marketing tactics for NFTs and crypto assets [16].

4. Challenges

Integrating the Indian knowledge system into the curricular framework for blockchain and the Metaverse may face many hurdles.

[1] Technical Complexity: The ideas of blockchain and the Metaverse are intricate and may not easily correspond with conventional Indian knowledge systems. Combining contemporary technology with age-old philosophical and mathematical ideas may provide difficulties in understanding for both students and instructors.

[2] Insufficient Resources: Creating educational materials that combine Indian knowledge systems with blockchain and Metaverse education demands substantial resources such as research, curriculum design, and teacher training. Scarcity of resources may impede the implementation process.

[3] It is vital to include Indian cultural components into debates about blockchain and the Metaverse with respect and truth. Misrepresenting or oversimplifying cultural topics may cause confusion or misinterpretation among pupils.

[4] Resistance to Change: The introduction of new curricular frameworks that blend Indian knowledge traditions with contemporary technology may encounter opposition from traditional educational institutions or stakeholders who are used to more conventional teaching methods.

[5] Access and Equity: It is crucial to provide fair access to education in blockchain and the Metaverse, especially in rural or underdeveloped regions. Inequalities in technology access and internet connection may worsen existing disparities in educational prospects.

[6] To integrate Indian knowledge systems with technological issues such as blockchain and the Metaverse, cooperation is needed across several disciplines such as education, technology, humanities, and cultural studies. Integrating these varied sectors may provide logistical and organizational difficulties.

[7] Balancing the rigidity of technical principles with the fluidity of cultural and philosophical considerations in the curriculum framework may be hard due to curricular flexibility. Adaptability in designing and implementing the curriculum is essential to adjust to the ever-changing aspects of technology and culture.

[8] Evaluation: Creating suitable techniques to evaluate student learning and comprehension within an integrated curriculum is a challenging task. Conventional evaluation approaches may not fully reflect the diverse nature of learning outcomes within this multidisciplinary framework.

To overcome these problems, it is essential to meticulously prepare, collaborate, and continuously assess the curriculum framework to guarantee the successful integration of Indian knowledge systems with blockchain and Metaverse education.

5. Future Scope

Incorporating the Indian knowledge system into the curriculum for blockchain and the Metaverse has the potential to greatly influence the future of education in India in several ways.

[1] By integrating aspects of India's cultural and philosophical legacy into conversations about blockchain and the Metaverse, students may enhance their cultural identification and appreciation. This enhances their learning experience and cultivates a feeling of pride in their cultural background.

[2] Ethical Considerations: Indian philosophical concepts like dharma, karma, and ahimsa provide important insights on ethics in technology creation and use. Incorporating these ideas into the curriculum aids students in grasping the wider consequences of their activities in the digital domain.

[3] The combination of ancient Indian knowledge systems with new technologies such as blockchain and the Metaverse promotes innovation and creativity. Students are encouraged to utilize old knowledge in fresh ways to address modern problems, promoting creativity in the education system.

[4] Sustainable Development: Traditional Indian wisdom prioritizes living in harmony with nature and adopting sustainable methods. By incorporating these ideas into conversations about blockchain and the Metaverse, students acquire the capacity to create technological solutions that emphasize environmental sustainability and social responsibility.
5. Enhancing students' global competitiveness by providing a comprehensive education that combines Indian knowledge systems with advanced technology. It helps students manage the intricacies of a quickly changing digital environment and participate in the worldwide discussion on technology and society.
6. Integrating Indian knowledge systems with blockchain and Metaverse education promotes interdisciplinary learning, fostering a holistic approach. Students get a broad grasp of several areas such as technology, mathematics, philosophy, and cultural studies, which enhance their critical thinking and problem-solving abilities.
7. Utilizing local case studies and cultural references in the curriculum promotes community participation and cooperation. Students may engage in projects that tackle real-world difficulties in their communities by combining traditional knowledge with new technological solutions.

[5] 8. By integrating Indian knowledge systems with blockchain and the Metaverse into the curricular framework, students cultivate an attitude of lifelong learning and adaptation. They are more prepared to handle upcoming technological developments and make valuable contributions to society in a constantly evolving environment.

The potential for integrating Indian knowledge systems into the curriculum framework for blockchain and the Metaverse is promising. This integration aims to provide students with a comprehensive and culturally

relevant education that equips them to succeed in the digital era, all while honoring and promoting India's diverse cultural heritage.

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