**Crowdfunding in Education Using Blockchain**

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***Abstract:***

This paper investigates the potential of blockchain technology to revolutionize crowdfunding in the education sector. Traditional crowdfunding platforms often lack transparency and are susceptible to fraud. We propose a blockchain-based crowdfunding platform that addresses these issues by leveraging the technology's inherent features of decentralization, immutability, and smart contracts. This approach empowers various stakeholders in the education ecosystem, facilitating transparent, secure, and efficient fundraising, ultimately contributing to democratizing access to education.

**Keywords:** Crowdfunding, Blockchain, Education, Smart Contracts, Decentralization, Transparency.

**Introduction:**

Education plays a critical role in individual and societal development. However, access to quality education remains a global challenge due to financial

constraints. Crowdfunding has emerged as a promising tool to address this issue by enabling individuals and institutions to raise funds from a large pool of potential donors.

However, traditional crowdfunding platforms face limitations. The reliance on central intermediaries can lead to high fees, opaque processes, and potential fraud. Additionally, the lack of a secure and transparent transaction record hinders trust and accountability.

This paper proposes a novel approach utilizing blockchain technology to address these challenges and enhance the effectiveness of crowdfunding in the education sector.

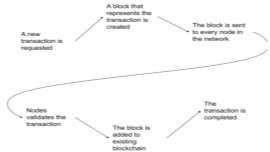
**Blockchain Background**

A blockchain is a decentralized-based technology that is distributed among the computers in a computer network. As a database, a blockchain stores information in the form of blocks and chains. One of the biggest successful real- world applications of blockchain is cryptocurrency currency like bitcoin. Blockchain uses a more secure and protected mechanism to keep records of transactions. Blockchain provides a guarantee of security to our data. Blockchain databases and typical databases are nearly the same. As both are used to store data, the only difference is how the data is structured in databases. Typical database stores data as it is provided by the user but in blockchain data is stored in blocks and blocks are linked to each other with the help of a chain. The technology behind block and chains is hashing. Each block has its own capacities and has information when it is completely filled a new block is linked to it and the new information is stored in a new block and the process continues as new data continue to come. One of the main advantages of blockchain is it provides us with a distributed, decentralized database but non editable. So even if we want to change our existing data, the blockchain does not provide us that functionality.

**How does blockchain work?**

As we come to know from the above discussion, the primary goal of blockchain is to make recorded data non editable. Blockchain working can be explained in nearly five steps which are as follows:

1. When a user/client is going to input the transaction blockchain must do the authentication of the user.
2. When the authentication is done, a new block is created with transaction information stored.
3. The newly created block is distributed across every node of the computer network.
4. The authorized nodes do their steps of verifying the transaction and after verifying transaction information are added to existing blocks with the help of chaining mechanisms.
5. Again, updates are distributed across the network. Thus, above finalize that the transaction history is stored in blockchain databases. The same steps are also shown in the below image.



*Figure 1. working of Blockchain*

# Benefits of Blockchain

1. **Accuracy:** Because blockchain is a distributed system, its database is dispersed among several nodes in computer networks. This means that the user never learns where the blockchain database comes from. This results in less human engagement in this technology, which leads to less human mistake and, as a result, less computational error by blockchain technology, which leads to tremendous accuracy**.**
2. **Cost Reductions:** Blockchain is very beneficial for cost reductions in transactions because blockchain eliminates the involvement of third-party such as banks. For example, every time business owners accept payments using credit cards there will be a small cut in payment from the bank for providing the services. Still, blockchain does not have central authority so there will be no or minimal transaction fees.
3. **Decentralization:** As we know from the above definition of blockchain that blockchain is a decentralized distributed system, so the blockchain database has many copies and is spread across the different computers in computer networks. Thus, if we have to add a new block to the database then every computer has to add it to its blockchain to reflect the change. Thus, blockchain becomes more difficult to tamper with. Even if a hacker tried to make a change to the blockchain then only that copy is affected other remains the same. Thus, decentralization property of blockchain helps in the security of data.
4. **Efficient Transactions:** Blockchain transaction is decentralized and it is not conducted by some authority. As we know that authorities operate their transaction during working hours and if we start a transaction on Friday then it takes three days to complete the transaction which means till Monday but the blockchain run 24/7. And also, blockchain completes the transaction in less than 10 minutes. Blockchain also takes almost the same time to complete cross-border trades which if it is done by other authorities take longer time due to difference in time zones issue and many more reasons. Thus, Blockchain provides an efficient mechanism for transactions.

1. **Transparency:** Blockchain provides transparency as most of the blockchains are open-source software. So, it will give us the functionality of reviewing the code, and gives suggestions to improve blockchain technology. thus, blockchain is completely transparent to the user. The Suggestions are going to implement only if the majority of network users agree.

# Literature Survey

When we did research on an existing paper, we found that it contributes to the emerging literature on financial technology by presenting the case of crowdfunding in financial inclusion. The rationale behind this inquiry is to demonstrate the relevance of crowdfunding to financial inclusion, and how might blockchain technology fuel the development of crowdfunding. This paper also constitutes one of the first attempts to analyse crowdfunding in. Thus, we believed that this result could apply in periodontology dentistry field in the near future. [1]

Another paper survey told us about In paper, to regulators and market participants to understand how the existing regulatory framework applies to blockchain-based crowdfunding. Due to specific characteristics of blockchain-based crowdfunding, regulatory frameworks may require potential re-interpretation of requirements to allow an effective application of regulations. To fill this knowledge gaps, we have reviewed a set of relevant literature on success factors for conventional and blockchain-based crowdfunding. The result of this literature review sheds light on the directions for future research and development. The contribution of our work is a better understanding of the distinctions and similarities of blockchain-based crowdfunding compared to traditional crowdfunding. [2]

When we did research this In paper work aims at creating an economical, multimodal, personal oral crowdfunding Dapp to help new developer in industry or new startup to overcome their problem of funds. Our purpose is to make digital world more advance for every single person using Blockchain technology. Due to our dapp new startup or new project will join, from that our community get bigger and bigger, and we can help each other. [3]

[4] Crowdfunding performs an important part in gaining budget for some causes or purposes like capital for education. The standards- grounded, that's criteria grounded assessment erected on affiliated literature as well as the particular situations of the examined social enterprise case.

[5] smart contracts do no longer require brokers or other intermediaries to validate the agreement, so that they eliminate the chance of manipulation by using 1/3 events, ensuing in fee savings and reduced fraud. clever contracts are assigned, it's miles almost impossible to trade previously assigned ones, and loopholes are feasible. A blockchain-primarily based clever settlement requires an excessive aid fee. smart contracts use cryptocurrency, which now not all governments have legalized.

**Limitation existing system or research gap**

***Limitations in Existing Systems:***

[1] Technical Complexity: Current blockchain-based crowdfunding platforms can be complex for users unfamiliar with blockchain technology, hindering wider adoption.

[2] Scalability: Existing platforms often struggle to handle a large number of users and transactions, limiting their potential reach and impact.

[3] Regulation: The lack of clear regulations surrounding blockchain and cryptocurrencies creates uncertainty for both users and platform operators.

[4] Limited Awareness: Low awareness of blockchain technology and its potential applications in education among potential donors and educational institutions can hinder adoption.

[5] Interoperability: Currently, different blockchain platforms often lack interoperability, making it challenging to transfer funds between different platforms**.**

**Research Gaps**

[1] Sustainability Models: More research is needed to develop sustainable business models for blockchain-based crowdfunding platforms in education, ensuring their long-term viability.

[2] Impact Assessment: Studies are needed to assess the actual impact of blockchain-based crowdfunding on educational outcomes and access to education.

[3] Security & Privacy: Further research is required to address potential security vulnerabilities and privacy concerns associated with blockchain-based platforms in the educational context.

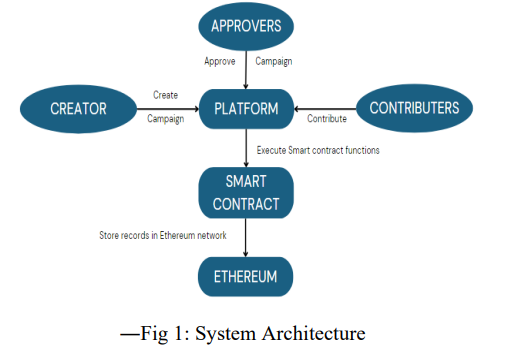
**Methodology**

**1.Proposed System:**

The proposed work aims to leverage blockchain technology for crowdfunding in education, creating a transparent and secure platform for students, schools, and donors. By utilizing blockchain’s decentralized ledger, we can ensure that funds are allocated directly to educational initiatives and track their use with utmost transparency. Smart contracts can automate disbursements and enable donors to have more control over how their contributions are utilized. This innovative approach not only fosters trust among stakeholders but also reduces administrative overhead, making education funding more efficient and accessible.

**2. System Architecture**

The proposed system consists of the following key components:



* **Blockchain Network:** A secure, distributed ledger for recording all transactions and platform activities. Ethereum or similar platforms can be used.
* **Smart Contracts:** Self-executing contracts containing predefined rules governing fundraising campaigns and automated fund disbursement based on specific conditions.
* **User Interface:** An interactive platform allowing users to create and contribute to campaigns, manage profiles, and track progress.
* **Reputation System:** An optional component that incentivizes honest behaviour and discourages fraudulent activity through reputation scores assigned to users based on past interactions and contributions.

**3. Workflow**

1. **Campaign Creation:** Users (students, educators, institutions) create campaigns specifying fundraising goals, project details, and fund utilization plans.
2. **Smart Contract Deployment:** A smart contract is deployed on the blockchain network, containing campaign details, disbursement conditions (e.g., reaching funding goal, achieving milestones), and reputation score requirements (optional).
3. **Donation and Recordkeeping:** Donors contribute funds through secure crypto wallets. Transactions are immutably recorded on the blockchain, ensuring transparency and auditability.

**d) Fund Disbursement:** Upon fulfilment of predefined conditions, the smart contract automatically releases funds to the campaign owner.

**e) Reputation System (Optional):** Users receive reputation points for successful campaign completion, timely updates, and positive feedback from other users. Conversely, negative actions like failing to deliver on promises or fraudulent activity could lead to decreased reputation scores, potentially limiting their ability to participate in future campaigns.

**4. Tools Requirement**

**Thirdweb**: - Thirdweb is a full stack development tool for web3 developers. It provides SDKs. for developers to build web3 apps, and deploy custom or pre-built smart contracts. Thirdweb can be used to Build, manage, and analyze web3 applications.

**Metamask**: - In order to access their Ethereum blockchain wallet, users can install Metamask, a web browser extension that serves as an interface between the browser and the Ethereum blockchain.

**Solidity**: - Solidity is a programming language. It is used to write smart contracts in blockchain.

**Future Scope**

The impact of blockchain technology on the crowdfunding landscape is vast, and its potential is truly endless. So, let’s look at the benefits that blockchain implementation could bring to crowdfunding app development. In the future, most technologies around the world are expected to use blockchain as an efficient way to make online transactions. One of the areas that blockchain technologies can be applied is crowdfunding platforms. The most common problem with current crowdfunding scene in around the world including is that the campaigns are not regulated and some of the crowd-funding campaign turned out to be fraud. Besides, the completion of some projects also was significantly delayed. This project aims to solve these problems by applying Ethereum smart contracts to the crowdfunding site to that the contracts will be fully automatically executed, thus preventing frauds and ensuring that the projects can be delivered within duration given.

**Conclusion**

This innovative approach to fundraising has the potential to revolutionize the way educational projects are funded, allowing for a more democratic and inclusive process. By leveraging blockchain technology, crowdfunding in education can provide a secure and efficient way for donors to support causes they believe in, while also ensuring thatfunds are usedfor their intended purpose. Additionally, the transparency of blockchain technology can help build trust among donors and recipients, ultimately leading to more successful and impactful educational initiatives. Overall, crowdfunding in education using blockchain technology has the power to transform the way we support and invest in education, creating a more equitable and sustainable future for learners around the world.

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