

# Exploration of Methods to Promote the Innovative Development of College Precision Financial Support with Blockchain

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## Abstract

Financial aid and education in colleges and universities are specific presentations of precision poverty alleviation. Currently, the college financial support has the problem of inaccurate support object, unevenly distributed financial sources and ineffective aid and education. By researching the main problems and connotation of the college poverty alleviation, and analyzing the application value of the blockchain in the college precision financial aid, the evaluation system of financial monitoring and effectiveness and college financial model in the view of blockchain are proposed creatively. The standardized, shared and differentiated and dynamic innovation development of college precision financial support can be created, leading to the progress of aid and education of colleges and universities.

## Keywords

Blockchain, Precision Financial Support, Method Exploration

## 1. Introduction

During the group study of Political Bureau of the Central Committee of the Communist Party of China in Oct. 2019, General Secretary Xi Jinping stressed to serve blockchain as an important propulsion of independent innovation of major technology, and promote the innovative development of blockchain technology and production [1]. As a core technology, blockchain possesses adequate quality of decentralization, openness, security, inalterability and tractability, with a bright prospect of college precision financial support [2]. It can also resolve the problem of information inequality, identification difficulty, inaccurate standard, and inability to evaluate the effect of financial support.

In this paper, by combining blockchain technology and college precision aid, the basic connotation of college precision aid, the current research and present main problems are analyzed. Then the application value of blockchain used in the area of college precision financial aid is explicated. Finally, the method of innovative development of college precision financial support with blockchain is created, forming a new model of standardized, shared, differentiated and dynamic college precision financial support.

## 2. Basic Connotation of College Precision Financial Support

When the general secretary Xi Jinping visited Hunan Province in Oct. 2013, he proposed a requirement: seeking truth from facts, adaptation to local conditions, classified guidance, and precision poverty alleviation. This is the first time when the concept of precision poverty alleviation has been proposed. In 2015, *Decision of the CPC Central Committee and the State Council on Winning the Tough Battle against Poverty* published by the State Counsel pointed out that precision poverty alleviation is necessarily required to win the battle against poverty and improve the effect of supporting the poor. In 2016, the Vice Premier of Ministry of Education Du Yubo proposed to establish the working mechanism of precision education [3]. Financial aid and education of colleges and universities is a specific implementation of precision poverty alleviation in the higher education, and the practice and development precision poverty alleviation theory. In 2018, the report on the development of financial aid for Chinese students introduced that 4.38789 million Chinese students have been supported with totally 11.503 billion RMB, benefited from the college students financial support policies made by the government, universities, and society. The number of students who got the financial aid and the amount of total fund got the highest ever [4]. The college precision poverty alleviation is a specific presentation of carrying out the spirit of the general secretary Xi Jinping that spiritual encouragements come the first when supporting the poor, which has promoted and elevated the effect of college financial aid. Below are two specific connotations of the spirit:

### 1) Material poverty alleviation should be precise

The demands of the poor students tend to be diversified. The task on the top of the list is to ensure their basic conditions of study and life, and realize the precision material poverty alleviation. The material poverty alleviation mainly includes: precise financial aid object, precise standard, precise fund distribution, and precise grant.

Precise aid object identification is the precondition in terms of aid and education and, accurate and targeted aid. In Oct. 2018, *Guidance on Identifying Students with Family Financial Difficulties* were published by the Ministry of Education and five other departments, which firstly normalized the principle and working process of the identification for the students with financial difficulties, and proposed higher requirements for the precision of aid object, and provided

the system guarantee for the identification process [5].

The standard of financial aid and grant should be precise. The students with financial difficulties of different kinds should be aided with different standards. For instance, more sources should be distributed to poorer areas of Tibet, Sidi prefecture in southern Xinjiang, Tibetan areas of the four provinces, Linxia prefecture in Gansu Province, Liangshan prefecture in Sichuan Province, and Nujiang prefecture in Yunnan Province, as well as ethnic colleges, and agriculture, water, geology and petroleum based ones. It can help to prevent imposing uniformity in all cases.

The release of funds should be precise, in order to effectively carry out poverty alleviation and help those who are really poor. Cronyism, favoritism, or misappropriation of state funds should be absolutely forbidden. The funds should be distributed to the students in time and in full, to continuously improve the benefit of the financial aid.

## **2) The spiritual assistance should be precise**

As a saying goes, give a man a fish and you feed him for a day. College aid and education not only lies in resolving the economic problems of the students, but also guiding the poor students to improve their lives by themselves. After ensuring that “no student is allowed to drop out of school due to family economic problems”, college funding should achieve the precision of spiritual poverty alleviation in terms of funding needs and funding effectiveness.

The precision of financial demand is presented in the students’ need of study, psychology, and integrated quality. University students are different individually, thereby with different demands. Based on the material precision poverty alleviation, the individual differences should be taken into consideration and teach students in accordance with their own aptitude. By converting financial aid into improvement of ability, self-efficacy of students can be improved in the process of being aided financially.

Precise evaluations for the financial aid effectiveness is the specific presentation of college aid and education process, specifically classified into implementation of financial aid policy and the efficacy of aid and education. The systematic aid and education system should be constructed in college precision aid and education, dynamic monitoring and management mechanism established, financial aid effectiveness evaluation system for precise management set up, financial aid policy implemented, and the benefit of aid and education should be fully utilized.

## **3. Review of College Precision Financial Aid and Current Problems**

### **3.1. Current Researches on College Precision Financial Aid**

In this paper, take CNKI (China National Knowledge Infrastructure) for instance, over 900 references can be found with “precision financial aid” as the keyword. By analyzing these literatures, the research results can be obtained, as



precision construction and precision interference” psychology poverty alleviation [13].

### 3.2. Problems in College Precision Financial Aid

After years of development, a diversified financial aid system has been formed, scholarship, stipend, loan, and work-study program having been the methods for it. Through analysis, it can be obtained that three problems still remain in the college precision financial aid, as shown below.

#### 1) Imprecise aid object

In Oct. 2018, *guiding opinions on the identification of students with family financial difficulties* was published by the Ministry of Education and five other departments, which mentioned that the object of the identification process is the students with financial difficulties who are not able to afford the normal life and study in school. The accordance of the identification mainly includes family economic factors, special group factors, emergency factors, and student consumption factors etc. However, there are still some problems with the identification for the family economic difficulties, leading to the imprecise identification object. For example, in terms of the freshman students who have just entered the school, due to the susceptible reliability and authenticity certificates given by the department of poverty alleviation, the inaccuracy of the identification will be easily caused when identifying the students with financial difficulties according to the certificate or other measurement systems. Currently the identification process mainly includes aid policy publicity, student application, grade or class appraisal, college appraisal and university recheck, with qualitative and quantitative processes. Moreover identification process gets harder when it comes to orphan, government admission for poor family, family specially cared by the government. Yet for most ordinary students, it is hard to authenticate their poor family conditions. Although it is required by the Ministry of Education to put more efforts into investigations of poor students, learning about every of them on the spot is still hard. So that such phenomenon can be caused that the students identified to be poor are not really poor, while those who really have great financial difficulties are not admitted by the government.

#### 2) Unreasonable source distribution

On the one hand, the economic development of our country is not balanced, with different development levels in different provinces, leading to large differences of financial aid to poor students. Universities and colleges, especially those in underdeveloped areas, there are usually a great number of poor students, but the amount of fund is limited. On the other hand, the scholarships are distributed with a unanimous standard in different universities. For example, the national stipend is classified into three levels. Then the school assigns the quota of candidates to different colleges according to the number of students and applications, and the colleges assign in the same way to the majors, and finally to the classes. However, due to variant economic situations of students in different colleges, and still diversified cases in different classes, the demands of each individ-

ual and needed financial aid patterns are not taken into consideration, easily causing uneven and unbalanced distribution of resources.

### **3) Ineffective financial support**

The college financial aid is often biased on material aid, while spirit aid neglected, that is, the education and guidance on study, psychology, career planning of financially poor students are not sufficient. Mere material aid makes students set up an awareness to wait for the financial aid, rely on it, or even ask for it, thinking themselves deserve the financial aid, which violates the purpose of the national financial aid project. In the precision financial aid, due to the lack of evaluation system for the aid effect, the combination of material aid and virtue edification as well as complete financial aid system, the precision of the financial aid is therefore lost.

## **4. Application Value of Blockchain Used in the College Precision Financial Aid**

### **4.1. Introduction of Blockchain**

In 2008, a man with a pseudonym of Satoshi Nakamoto published a paper named *Bitcoin: A Peer-to-Peer Electronic Cash System* which first introduced the concept of blockchain and marked the birth of it [14]. In 2018 the general secretary Xi Jinping proposed to enhance the research on the new generation information technology represented by blockchain artificial intelligence, quantum information, Internet of things (IoT).

Blockchain is a new underlying information technology (IT), and also a new application mode of computer technology such as distributed data memory, point to point transmission, consensus mechanism, encrypted algorithm etc., endowed with decentralization, trustlessness, open to public, inalterability and tractability. Decentralization, apparently, means “no fixed center”. Every node on the chain is a center. Decentralization guarantees the security and stability of the system. On the blockchain, all data can be open to public, except the secretive information which needs to be encrypted. Therefore, trust degree can be developed between the nodes on the blockchain. Meanwhile, all data on the blockchain can be hardly altered, and also tractable, lowering the operation and supervision cost.

With the reform of technology, the blockchain is widely applied in the area of political affairs, education, healthcare, public service and social aid. With Internet plus and blockchain plus combined, the process of dealing with affairs can be optimized, the operation cost lowered, thereby contributing to the improvement of people’s everyday life.

### **4.2. Application Value of Blockchain Used in College Precision Financial Aid**

Blockchain is very significant to the current college precision financial aid. According to the features of blockchain, the application values of it mainly include

ability to provide more precise information for identification of college precision financial support, provide accurate accordance for the financial aid standard, monitoring the process of distributing the fund, providing reference and platform for personal guidance, and providing technical support for the improvement of financial aid effectiveness.

### **1) Providing more information about identification**

The fundamental reason for the financial aid difficulties is the information asymmetry of students who applies for family financial difficulty identification and the group members in charge of identification process. The information is provided by the students who fill in the forms or register in the system given by the college. It has been found that students sometimes provide different information in different given systems about their basic information such as family incomes and family economic sources etc. For another, the family financial difficulty questionnaire has not been used in the colleges, so students only need to fill out the identification form of family financial difficulty to apply for the identification. The authenticity of the information filled in the form should be taken into further consideration. The asymmetry between the checkers and applicers is the foremost factor to cause the imprecise aid object, increasing the difficulty of the identification process greatly. However, by using the blockchain, the everyday consumption and family economic situations of university students can be accurately obtained, which can resolve the asymmetry problems mentioned above and set solid foundation for precision financial aid.

### **2) Providing financial standard accordance**

The trust mechanism established by encryption and sharing algorithm is an important function of the blockchain. The technology of blockchain can promote the revolution of the college credit investigation system management. Based on the features of inalterability, time stamp and data sharing, the truth and reliability of the information given by students can be guaranteed. On the other hand, the phenomenon of imposing uniformity in one case in the college financial quota distribution can be changed. After obtaining the family economic information of all the students in the college, the quota can be distributed according to the specific situations of individuals, thereby breaking the common practice to ratio-based quota distribution.

### **3) Monitoring the fund distribution**

With the inalterability and tractability of the blockchain technology, all users on the blockchain can check the distributions of scholarships and stipends, which makes it more convenient to track and monitoring the fund distributions, hence ensuring the precision of releasing the funds.

### **4) Providing guidance platform**

After using the blockchain technology to obtain the basic information of students' family economy, learning and living conditions, it can provide personalized guidance for students, such as in psychology, career, employment, entrepreneurship and other aspects. By using the innovative technology of "smart contract" of blockchain and the point-to-point cooperation system constructed

by blockchain, colleges and universities can realize the sharing of high-quality education resources, the individualization of students' learning, and the dynamic update of high-quality courses, providing a high-quality platform for the development oriented funding of colleges and universities.

#### **5) Providing technological support**

The blockchain transcript is an importance practice of applying the blockchain to mathematical badge, that is, learners can have their own learning process and accordance by blockchain, and manage their learning contents by themselves. Thus the process and results of the students self learning can be completely presented, which breaks the tradition that the school files the student transcripts [15]. Based on this, in the process of carrying out all kinds of aid and education programs, the participations of the students into the classes will be recorded and can be monitored, which provides technical support and insurance for the precise evaluation of financial aid effectiveness.

### **5. Exploration of Methods to Promote the Innovative Development of College Precision Financial Support with Blockchain**

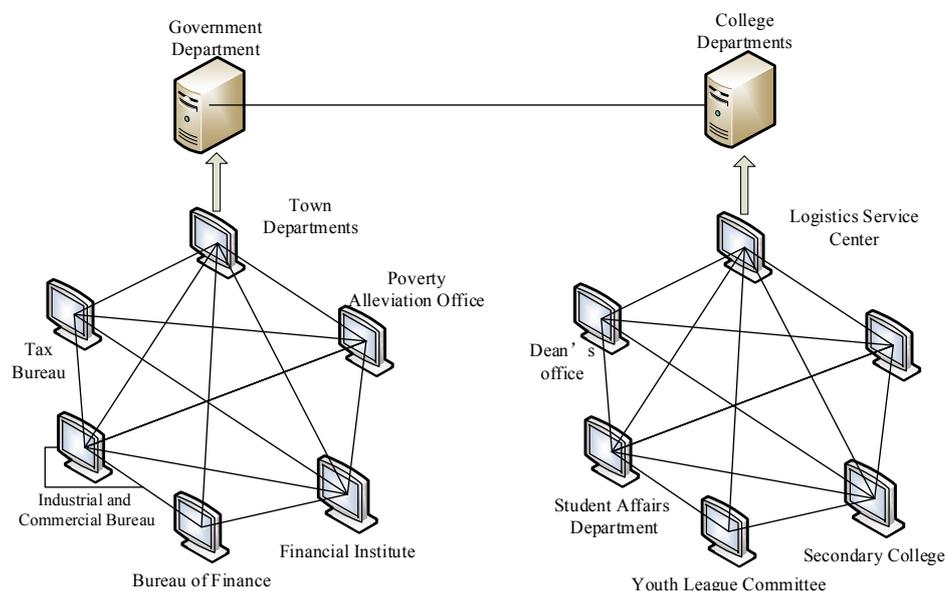
With the development of informationization, the technologies of big data, Iot, artificial intelligence are closely combined, which has found wide applications in the area of finance, energy, smart logistics, and public services. Under the background of blockchain, by using the consensus mechanism, decentralization, trustlessness, and common monitoring, college precision financial aid should be based on virtue edification, to educate students with virtues, and construct the student-cantered precision financial aid model where students are taught with the accordance to their aptitude.

#### **5.1. Eliminate Detached Information Island, and Promote Financial Aid Object through Multilateral Cooperation**

The blockchain is featured by information memory, data analysis, which are advantages in college precision financial aid. Decentralization and point-to-point distribution memory model can eliminate detached information island, and promote multilateral cooperation, which can provide data analysis for precision financial aid. In the identification process, the college mainly considers two aspects, including everyday consumption and basic family condition. From the perspective of blockchain, the students study and life and their family financial conditions can be obtained by using data information service technology platform.

In current college financial aid system, the data communications among the different parts of colleges and local government. The detached information island like this severely influences the precision of college financial aid. The blockchain can remove the detached information island effectively, which promotes the college precision financial aid [16].

As shown in **Figure 2**, it is a block diagram of college precision financial aid



**Figure 2.** College financial aid model in the view of blockchain.

under the background of blockchain. In all departments of colleges and universities, the Student Work Department of the Party committee, the Dean's office, the psychological development and service center, the Communist Youth League, the secondary college and other departments exchange information on the blockchain, and there is no absolute center on the chain. The logistics service center can provide the students' consumption situation in school, the Dean's office can provide the students' learning situation, and other relevant departments can provide the students' quality and ability improvement in the university. In the government departments, colleges and universities can obtain whether the application students are from the families having applied for minimum living insurance, listed as poor by the government, with orphan or disabled family members, or being preferentially treated by government, or even obtain the data related to poverty support in banks, taxes, insurance, etc. of their family members, so as to comprehensively and deeply understand the poverty level, poverty category and the causes of poverty of the application students. With the support of blockchain technology, information can be exchanged between the government and universities, the aid object can be determined more accurately, making aid and education more standardized.

### **5.2. Break through the Decentralization Mode, Multilaterally Supervise and Guarantee the Accuracy of the Funding Standard**

By taking advantages of decentralization, security, and openness to public, a blockchain precision financial aid model can be established, with universities, colleges, grades and students integrated as a whole.

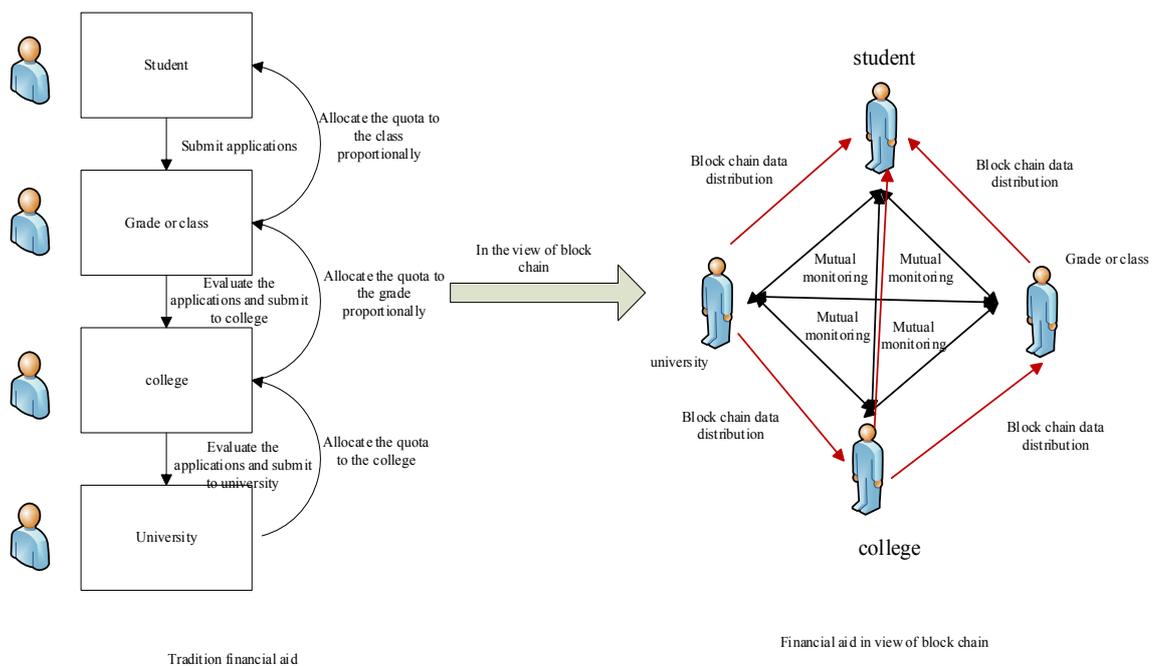
The traditional mode of funding is that students apply to the grade or college, and the college submits the applications to the school, which is a single way, and

most colleges and universities allocate funding quota according to the proportion, which is easy to cause the inconsistency of funding standards. Taking advantage of blockchain technology, the precise funding model can effectively solve the problems of unreasonable resource allocation, closed evaluation process, opaque use of funding funds, and inconvenient supervision of fund use, and realize the sharing of funding model. As shown in **Figure 3**, in the perspective of blockchain, when colleges and universities allocate the quota, they can allocate according to the family economic situation of students in each college, breaking the traditional proportional allocation method.

At the same time, by using the consensus mechanism and traceability mechanism of the blockchain, on the one hand, once students are found to have data exceeding the limit, the corresponding funding can be reduced. On the other hand, for the students who have financial difficulties in their families, they can be directly connected with colleges and universities to achieve accurate “blind assistance”, so as to realize the dynamic management of funding. In terms of the flow direction of the funding amount, the funding object and the fund are precisely matched, and the information of the amount flow and the information of the fund distribution are put on the open chain. Once there is an abnormality in the flow direction of the fund, all people on the chain can find it out. Based on this, everyone can monitor the flow of funds in real time to ensure the accuracy of fund distribution.

### 5.3. Construct Aid and Education Evaluation System and Realize Precision Financial Aid Effectiveness

Financial aid, basically speaking, is purposed on education. Currently, all kinds



**Figure 3.** The model of tradition financial aid and financial aid in view of block chain.

of education projects have been implemented by universities and colleges, in order to improve the integrated quality of students by their practice and experiences, and reach the purpose of education. However, the present aid and education programs are often focused on the appearances, with a lack of effective evaluation system. A software named “dream space”, which is used for students to register for the extra-curriculum activities, created by the League Central Committee is an excellent extra curriculum platform, but with some imperfect functions. Yet the system combined with blockchain and education can make students study individualized, updating of excellent courses dynamic and shared. Students can not only learn about the courses, but also share their own courses on the chain, forming their own transcripts and ability evaluations.

From the perspective of blockchain, first, we can obtain the types and causes of poverty of students according to the model built in **Figure 2**. Then classify them according to the preferences or current abilities of the students to be assisted, and carry out financing and education activities in innovation and entrepreneurship, academic guidance, skill training, job guidance, career planning, etc. Activities are carried out on and off the chain at the same time. Students can share their recorded courses while improving themselves. The whole chain can be viewed without the need for a third-party platform, breaking the traditional “middle business” mode and helping students develop. By using the traceability characteristics of blockchain and the function of smart contract, actively promote students to participate in funding projects, record students’ learning situation, form learning report card, supervise the learning and life of the assisted students in real time, so as to achieve the standard of funding efficiency.

## 6. Conclusions

This paper studies the application value of college precision financial aid and the internal logic of college precision financial aid innovative development, by analyzing the current researches and problems about college precision financial aid with literature investigation. Three paths of innovative development of college financial aid in view of blockchain, removing isolated information island, promoting the precision of aid object by multilateral cooperation, and breaking through the centralized mode, are proposed creatively. By monitoring the precision of guarantee aid standard and establishing aid and education system, the higher precision of aid effectiveness is achieved. The standardized, sharing, differentiated, and dynamic innovative development mode of college precision financial aid is created, enhancing the college education and aid project.

As the core technology of national strategy, improving the development and research of blockchain has already been an inevitable trend. Especially further research into education area will inject fresh vitality for higher education and precision aid and education. Online and offline education will be converted to be an integration of online and offline and on and off chain one, forming a new education development mode.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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