APPLICATIONS OF FUZZY COMPREHENSIVE EVALUATION IN THE COLLEGE CAMPUS LOANS MANAGEMENT

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ABSTRACT
In recent years, the problems caused by college campus loans have not fallen. How to effectively solve the negative impact of campus lending on the campus has become a hot issue that needs to be solved urgently. This paper analyzes the current situation of campus loans by means of a questionnaire survey of students from Anyang Normal University. Then the evaluation model of the influencing factors of campus loan is established by fuzzy comprehensive evaluation, and the weight of each factor of campus loan is obtained by using the analytic hierarchy process, which makes the evaluation result more objective and scientific. Finally, some suggestions on how to deal with campus loans are given from the government, school, family and students, in order to increase the correct understanding of campus loans and promote the healthy growth of college students.
Keywords: campus loan, AHP, fuzzy comprehensive evaluation

INTRODUCTION

In 2015, Internet finance was first included in the national planning recommendations in the "Internet Plus" era. The campus loan is a model based on the Internet and providing Internet financial loan services such as installment shopping and cash consumption for college students. Under the policy background of the national "inclusive finance", it has rapidly occupied the market of colleges with its unique advantages[1]. With the rapid development of social economy and information technology, the change of consumption structure is promoted, and online shopping has become a consumption trend of college students. To a certain extent, campus loans have solved the asymmetrical problems of limited funds for college students and exuberant consumer demand. However, due to the lack of strict supervision over Internet finance, campus loans have spawned cases such as "violent repayment of loans" and "naked loans"[2, 3]. Campus loan induces college students who have strong intention of credit consumption to consume ahead of time. Excessive consumption will inevitably affect college students' own outlook on life, values and world outlook, which is not conducive to the construction of social credit system. Driven by campus loans, some students with strong consumption desire are lost in the wave of Internet finance. Excessive consumption tends to breed bad campus ethos such as hedonism and moneyism, and at the same time makes the whole family involved in the whirlpool of usury [4].

In real life, a thing is often influenced by many factors. Therefore, when evaluating a thing, we should consider all kinds of relevant factors synthetically, and then give a reasonable decision, which is usually referred to as a comprehensive evaluation problem [5]. However, people's evaluation of things is often unclear, but some vague language (such as good, poor, etc.) as different levels of comments. Therefore, it is very important to use fuzzy set theory to judge things synthetically. Fuzzy comprehensive evaluation is based on the determination of evaluation factors, evaluation grade criteria and weights of factors, the principle of fuzzy linear transformation and the principle of maximum membership degree are used to construct the fuzzy evaluation matrix. The grade of the evaluation object is determined by multilayer compound operation, which is suitable for the object system with many evaluation factors and many structure levels. Facing so many influencing factors of campus loan, we need to grasp the main influencing factors and put forward preventive measures.

This paper takes colleges in the north of Henan Province as the research area, investigates the students' understanding and consumption perception of campus loan in Anyang Normal University by means of questionnaire, in order to obtain the preliminarily understands the situation of campus loan in the university campus and the reasons for its prevalence. Then, the index system and grade standard of the influencing factors of "campus loan" are preliminarily determined, and the qualitative analysis of the index set of factors formed by experts based on the research results and experience are carried out. The factors containing uncertain information are processed quantitatively according to the function of fuzzy sets, and the key factors and their order are determined by AHP. A multi-level fuzzy comprehensive evaluation model is constructed to evaluate and analyze the influencing factors of campus loan, and the grade level of the influencing factors is determined according to the principle of maximum membership degree. Finally, combined with the evaluation of the influencing factors of "campus loan", the paper puts forward practical suggestions to help students set up correct values, and make students stay away from campus loans.

A Survey of the Present Situation of "Campus Loan" in Colleges

During the period from July to September 2018, based on the principle of representativeness and comprehensiveness, questionnaires were distributed to students of Anyang Normal University through questionnaire network platform. The questionnaire mainly involved students' identity characteristics, behavioral characteristics, credit rating and platform evaluation. A total of 160 questionnaires were distributed, 160 valid questionnaires were collected, and the recovery rate was 100. Then we analyze the current situation of "campus loan" from the perspective of the average monthly living expenses of college students, the sources of living expenses and the ways to understand the campus loans.
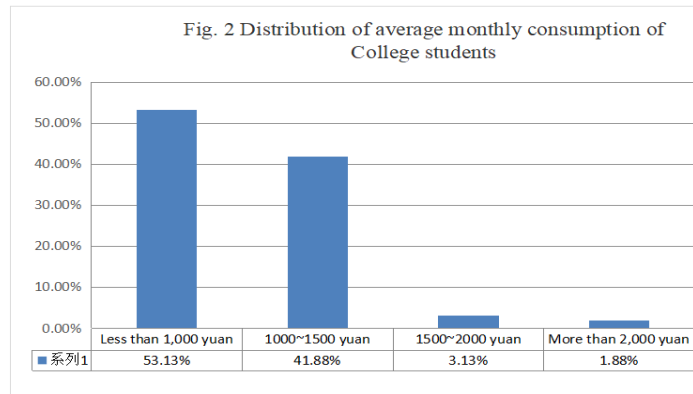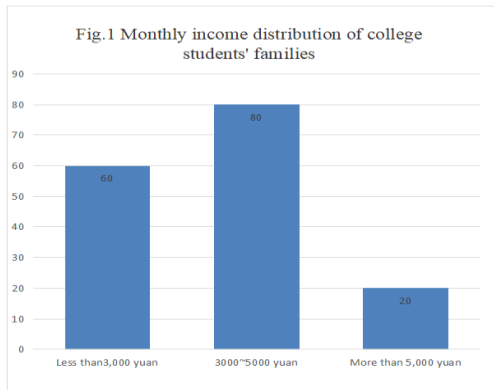
(1) The Group Structure of Participating in the Investigation of "Campus Loan"

In this survey, 45 male students (28.13%) and 115 female students (71.88%), the ratio of male to female is about 1: 3, which basically accords with the gender distribution of students in local normal colleges. In terms of grade distribution, 43 freshmen (26.88%), 101 sophomores (63.13%), 10 junior students (6.25%) and 6 senior students (3.75%) were investigated. The grades of the sample objects are mainly distributed in the freshman and sophomore stages, while the junior and senior students are busy with the entrance examination and graduation preparation, so the distribution of the investigated objects is more reasonable.

**(2) Characteristics of the Survey Results of "Campus Loan"**

i. A Single Source of Monthly Living Expenses, Which Basically Meets the Needs of Living

According to the survey data (see Fig. 1), the monthly income of college students is less than 3,000 yuan, accounting for 37.5%, the monthly income of family members is 3,000 yuan to 5,000 yuan, accounting for 50%, and the households with high income of 5,000 yuan or more account for 12.5%. In the average monthly consumption of college students (see Fig. 1), the level of 53.13% is below 1,000 yuan, that of 1000 yuan to 1,500 yuan is 41.88%, and that of 2000 yuan is 1.88%. The source of daily living expenses, 88.13% of the students ask for a part of the parents, accounting for 41.88% of the students earn part-time work for part-time work such as tutoring, while only 2.5% of the student groups use the ants and other overdraft platforms to borrow. It can be seen that most of the student families are not too rich, so their living expenses are basically below 1,500 yuan, which may meet the basic life of eating, studying, etc., and their living expenses are relatively simple. Most of them need to ask their parents for living expenses. If they want to spend more than the cost of life, they have to find another way, which provides a certain possibility for campus loans.

Fig.1 Monthly income distribution of college students' families

Fig. 2 Distribution of average monthly consumption of College students

	Less than 1,000 yuan	1000~1500 yuan	1500~2000 yuan	More than 2,000 yuan
■系列1	53.13%	41.88%	3.13%	1.88%

ii. Strong Consumption Desire and High Proportion of Non-essential Consumption

According to the survey (see Fig. 3), 78.13% of the students spend their usual time in class, while 10% of the students spend their time on entertainment and other recreational activities. 4.38% of the students spend most of their time working part-time to earn some living expenses. Only a small number of students spend most of their time on shopping and spending, accounting for 1.25. Figure 4 shows that in addition to living and studying expenses, most students spend their living expenses on makeup, cosmetics, etc., as well as leisure and entertainment. Electronics consumers also accounted for a higher proportion of 72.5 percent of students said that their non-essential consumer goods accounted for less than 20 percent of the monthly living expenses of 27.5 percent of students said that their non-essential consumer goods accounted for 2050 percent of the monthly living expenses. Cosmetics, electronic products are relatively expensive, college students have limited economic ability, lack of self-control, coupled with various temptations and comparisons, resulting in their blind and irrational consumption and excess, leading them to blind and irrational consumption and excessive and advanced consumption, which often fall into the trap of "ducing online loans".


Fig.3 College students' usual lifestyle

Fig.4 Status of cost-of-living expenditure
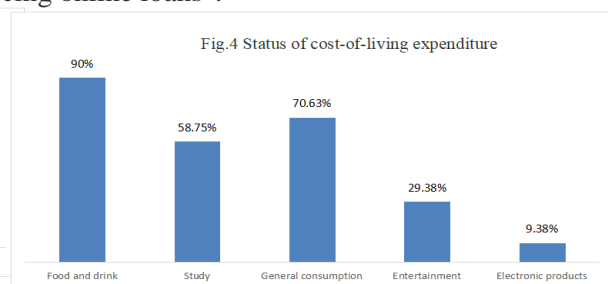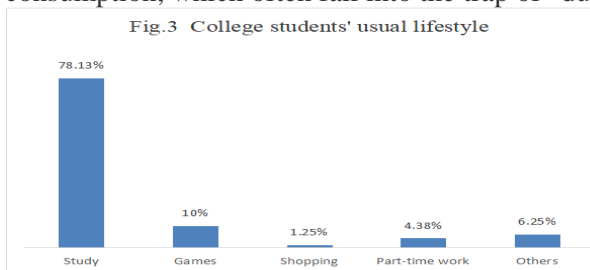
iii. Little Understanding of Campus Network Loan Platform

The survey data showed that 35% of students had access to shopping platforms (such as fun stage, Fenqile, etc.) and 73.13% had access to traditional e-commerce (such as JingDong campus white slips, Alipay, ant flower pot). 9. 38% of the students have come into contact with P2P loan platform (for example, love to learn loan, famous school loan). Although they have come into contact with these online lending platforms, most students know very little about them. 91.25 percent of students do not know the borrowing rate of the overdraft platform, and 3.13 percent of the students who are in urgent need of money say they will borrow from the overdraft platform regardless of the high interest rate. In the case of loans, only a small number of students said that they would continue to consume non-essential items, and 11.25% of the students thought that the network loan platform was not very safe and 9.38% of the students thought that the threshold of the network loan platform was low and that it was easy to use. 11.88% of the students think that the interest rate of the network loan platform is high and difficult to use. In the process of shopping, we often encounter the situation of "quick money". At

this time, they will be muddled with the credit of sesame seeds, flowers, ants, and other Internet loan platforms.

iv. Weak Ability to Repay "Campus Loan"
23.75% of the students indicated that they could not repay their loans on time after borrowing. Because the loan interest rate and repayment model are not clear, they are easy to fall into the debt crisis. As can be seen from Figure 5, in terms of repayment sources, 49% of students said that they would repay by part-time work. The task of college students is to learn, and lay a good foundation for the future to go to society. Passive extracurricular part-time will take up a lot. The time and energy will have a certain impact on the school; 30% of the students will reach out to their parents to repay the money, but the financial support given by the parents is limited. Such viciousness will definitely increase the family's economic pressure and drag down the life of the whole family; 4% of the students choose the "repayment of new and old" repayment method, and obtain the loan before the repayment of funds from the new loan platform, making it easier for college students who have insufficient self-control ability to fall into the trap of "campus loans". 17% of the students take loan repayments from friends. Although they don't have to pay interest on their friends' money, they can't pay back if they can't return them on

Fig.5 The way for college students to repay campus loans
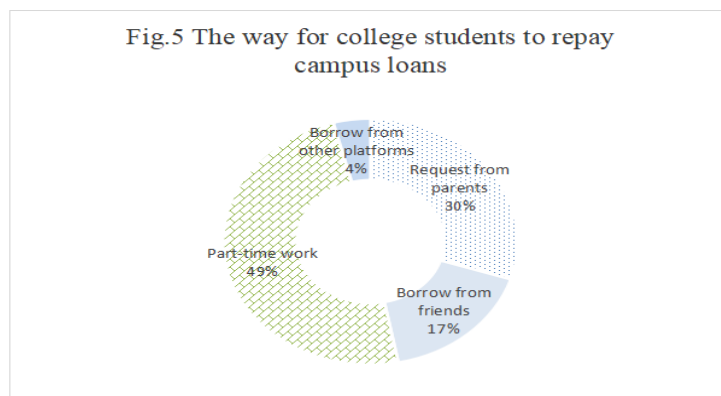
time or when they use their money urgently. This will affect the friendship between friends and is not conducive to subsequent borrowing. It can be seen that in the case of campus loans, students' repayment methods are generally weak, and it is easy to trigger different levels of debt vortex.

Fuzzy Comprehensive Evaluation Model
(1) Evaluation Index System and Evaluation Grade Standard of Campus Loan
According to the current research status, combined with the actual situation of our school, based on the principles of overall objectivity, scientific nature, dynamic and maneuverability of the construction of the index system, and extensively soliciting the opinions of the relevant experts, We have constructed the evaluation index system and grade standards of campus loan (see Table 1). Here the set of comments $V = \{v_1, v_2, v_3, v_4\}$ for which v_1 is serious, v_2 is medium, v_3 is mild, v_4 is general. Specific information can be found in the following table:

Table 1 Impact factors and evaluation results of campus loans

Primary indicator	Secondary indicators	Grade standards			
		Serious	Medium	Mild	General
Identity characteristics U_1	Gender characteristics u_{11}	18	40	61	41
	Learning status u_{12}	61	52	31	16
	Grade stage u_{13}	33	46	47	34
	Family economy u_{14}	76	47	33	4

	Living expenses u_{21}	78	64	14	4
Living condition U_2	Source of living expenses u_{22}	55	50	33	22
	Lifestyle u_{23}	37	39	55	29
	Consumption desire u_{24}	54	45	39	22
	Repayment mode u_{31}	57	68	29	6
Compliance capacity U_3	Repayment time u_{32}	70	49	36	5
	Renewal behavior u_{33}	66	64	24	6
	Loan interest rate u_{41}	34	57	29	40
Lending platform U_4	Loan mode u_{42}	33	30	56	41
	Loan risk u_{43}	54	51	40	15

(2) Establishment of Fuzzy Comprehensive Evaluation Model
The steps of establishing fuzzy comprehensive evaluation model are as follows:

Step 1. Determine the factor set. The factor set is a collection of various factors that influence the object of judgment, and is generally established by experts based on research results and experience. In the comprehensive evaluation of complex systems, because there are many factors in the evaluation, and each factor must be given a certain weight, then there must be the following problems: (a) it is difficult to assign weights; (b) there is no meaningful critical result. For this type of problem, we divide the set of factors related to the campus loan evaluation into four groups according to the attributes:

$$U_1 = \{u_{11}, u_{12}, u_{13}, u_{14}\}, \ U_2 = \{u_{21}, u_{22}, u_{23}, u_{24}\}, \ U_3 = \{u_{31}, u_{32}, u_{33}\}, \ U_4 = \{u_{41}, u_{42}, u_{43}\},$$

where U_1 is identity characteristics, U_2 is the living condition, U_3 is the compliance capacity, and U_4 is the lending platform.

Step 2. Determine the fuzzy evaluation matrix. Let $r_{ij} = \dfrac{T_{ij}}{160}$ be the degree of membership of evaluation factors to comments at all levels, the single factor evaluation matrixes are as follows:

$$R_1 = \begin{bmatrix} 0.1125 & 0.2500 & 0.3812 & 0.2562 \\ 0.3812 & 0.3250 & 0.1938 & 0.1000 \\ 0.2062 & 0.2875 & 0.2938 & 0.2125 \\ 0.4750 & 0.2938 & 0.2062 & 0.0250 \end{bmatrix}, \ R_2 = \begin{bmatrix} 0.4875 & 0.4000 & 0.0875 & 0.0250 \\ 0.3438 & 0.3125 & 0.2062 & 0.1375 \\ 0.2313 & 0.2437 & 0.3438 & 0.1812 \\ 0.3375 & 0.2813 & 0.2437 & 0.1375 \end{bmatrix},$$

$$R_3 = \begin{bmatrix} 0.3563 & 0.4250 & 0.1812 & 0.0375 \\ 0.4375 & 0.3063 & 0.2250 & 0.0313 \\ 0.4125 & 0.4000 & 0.1500 & 0.0375 \end{bmatrix}, \ R_4 = \begin{bmatrix} 0.2125 & 0.3563 & 0.1812 & 0.2500 \\ 0.2062 & 0.1875 & 0.3500 & 0.2562 \\ 0.3375 & 0.3187 & 0.2500 & 0.0938 \end{bmatrix}.$$

Step 3. Determining the index weight set. In the concentration of factors, the importance of each factor in the evaluation system is different. Therefore, in order to reflect the importance of each factor, each factor must be given corresponding weight. In this paper, the analytic hierarchy process (AHP) is used to calculate the weight of the influencing factors of college campus loan. Because the evaluation system has been adopted for many times, the importance of the evaluation system can be compared at the lower level first, and then rise to the higher level to carry on the similar treatment step by step, so the comparability degree of the evaluation system can be enhanced.

Table 2 Weight distribution of campus loan influencing factors

Target layers	Weights	Primary indicators	Weights	Secondary indexes	Weights	Total weights
Campus loan influencing factors	1	Identity characteristics U_1	0.2713	Gender characteristics u_{11}	0.0614	0.0167
				Learning status u_{12}	0.3102	0.0842
				Grade stage u_{13}	0.1336	0.0362
				Family economy u_{14}	0.4948	0.1342
		Living condition U_2	0.4840	Living expenses u_{21}	0.1571	0.0760
				Source of living expenses u_{22}	0.1346	0.0651
				Lifestyle u_{23}	0.4136	0.2002
				Consumption desire u_{24}	0.2947	0.1426
		Compliance capacity U_3	0.1140	Repayment mode u_{31}	0.3325	0.0379
				Repayment time u_{32}	0.1396	0.0159
				Renewal behavior u_{33}	0.5278	0.0602
		Lending platform U_4	0.1307	Loan interest rate u_{41}	0.6738	0.0881
				Loan mode u_{42}	0.1007	0.0132
				Loan risk u_{43}	0.2255	0.0295

Step 4. Two-layer fuzzy comprehensive evaluation. According to the synthetic operation " $*$ " between fuzzy sets, there are multiple computing models to choose from, such as model one: main factor decision type $M(\wedge, \vee)$; model two: main factor prominent type $M(\cdot, \vee)$; model three: weighted average type $M(\cdot, +)$; model four: take small upper bound sum type $M(\wedge, \oplus)$; model five: equilibrium average type $M(\wedge, +)$. The main factor deterministic type is more suitable for the case where the single evaluation is optimal and can be regarded as the optimal evaluation. The weighted average type depends on the weight of all factors and is more suitable for the case where the sum is the largest. Usually, we often use the the weighted average type $M(\cdot, +)$ to perform a layer of fuzzy evaluation $B_i = A_i * R_i = (b_{i1}, b_{i2}, \cdots, b_{in})$, the following evaluation results can be obtained:

$B_1 = (0.3878 \quad 0.2999 \quad 0.2248 \quad 0.0875), B_2 = (0.3180 \quad 0.2886 \quad 0.2555 \quad 0.1379),$

$B_3 = (0.3972 \quad 0.3952 \quad 0.1708 \quad 0.0366), B_4 = (0.2401 \quad 0.3308 \quad 0.2137 \quad 0.2154).$

Construct two-level fuzzy comprehensive evaluation matrix of U as

$$R = \begin{bmatrix} B1 \\ B2 \\ B3 \\ B4 \end{bmatrix} = \begin{bmatrix} 0.3878 & 0.2999 & 0.2248 & 0.0875 \\ 0.3180 & 0.2886 & 0.2555 & 0.1379 \\ 0.3972 & 0.3952 & 0.1708 & 0.0366 \\ 0.2401 & 0.3308 & 0.2137 & 0.2154 \end{bmatrix}.$$

Since the weight index set $A = (0.2713 \quad 0.4840 \quad 0.1140 \quad 0.1307)$ of $U = \{U_1, U_2, U_3, U_4\}$, then the model of the total single factor evaluation matrix is evaluated by fuzzy comprehensive evaluation

$$B = A * R = \begin{pmatrix} 0.3358 & 0.3093 & 0.2321 & 0.1228 \end{pmatrix}.$$

According to the principle of maximum membership degree, it is concluded that the influence factors of campus loan is at a "serious" level, which indicates that the campus loan evaluation indicators we screened are able to compare the status of comprehensive campus loans, thus verifying that the indicator system is more reasonable.

(3) Interpretation of Result

According to table 2, the status and living conditions of the primary indicators of campus loans account for 27.13% and 48.4% of the total, respectively. This shows that the key to attracting students to receive campus loans lies in their own behavior. Among the secondary influencing factors, life style accounted for 20.02% of the total, the proportion of which was the highest in the secondary index system, indicating that the influence was the most important; consumption desire accounted for 14.26% of the total; family economy accounted for 13.42% of the total; the influence of the two factors was second only to life style.

Suggestions and Measures for the "Campus Loan" in Colleges

Based on the investigation and statistical analysis of college students' campus loans, it is found that the monthly living expenses of college students are very little except for basic living and study consumption, while some students have a high proportion of non-compulsory consumption and strong consumption desire. It is easy to be tempted by campus loan under the condition of lack of guard consciousness to campus loan, and the students' repayment ability is weak, which is easy to fall into the debt whirlpool of campus loan, which brings heavy burden to students' psychology and family economy. Therefore, college students should correctly understand and treat campus loans so as to ensure their healthy growth. In order to purify the financial market environment on campus, next, according to the above discussion results and the order of the weight of the influence factors of campus loan from strong to weak, and combining the consumption ability and consumption characteristics of college students, we from the government, school, The four levels of family and students give some suggestions on how to deal with campus loans, so that campus loans can return to healthy development, and students can grow up healthily.

(1) Government level: Government should establish and perfect the relevant system, strengthen the supervision of the campus network loan platform, and strictly set up the qualification of the loan institution. First of all, the government should make perfect laws and regulations, strictly strengthen the management of network credit platform, especially in the management ability, business qualifications, credibility and other aspects of the key screening [6]. In order to meet the reasonable demand of credit funds and financial services for college students in terms of consumption, entrepreneurship, training, etc., the government should make clear the entry threshold of the network loan platform, and audit and classify the financial products provided by the campus network loan platform. Guide campus network platform to provide students with more learning training, consumer entrepreneurship and other customized, standardized financial services [7]. Secondly, the government should speed up the establishment of the network lending platform industry association and the campus credit risk management system, strengthen the self-discipline behavior of the network loan industry, set up the credit quota and loan interest rate reasonably. Prohibition of inductive business promotion and false and unfair competition in the industry [8]. Finally, we should establish a risk early warning mechanism, strengthen the investigation and evaluation before loan and the information protection of the lender, and pay attention to the management and supervision after loan.

(2) School level: School should help students set up the correct view of consumption, popularize the education of financial knowledge, and do a good job of financial aid for students with financial

difficulties. First, we should strengthen the education of college students' socialist core values, pay more attention to the psychological changes and growth needs of students, create a good campus atmosphere, and actively guide students to establish a rational consumption view. Correct the unhealthy consumption atmosphere among the college students in time. Second, we should start financial education courses, hold lectures and competitions on the financial knowledge of the campus loan series, and invite financial experts from financial institutions, internet security and other departments, as well as bankers, to make special presentations on campus. Let the students understand the financial knowledge such as campus loan and network security knowledge, guide the college students to use the financial platform of campus network loan correctly, strengthen the awareness of risk prevention and self-protection, set up the correct view of wealth and consumption. To promote the development of students in learning, entrepreneurship, and so on. Third, schools should set aside some funds specifically for studentsundefined borrowing and spending on studying and starting a business. At the same time, they should do a good job of subsidizing students with financial difficulties, and give students from poor families more jobs for work-study and practical work. Do not make any of the financial difficulties of students into the "campus loan" quagmire [9].

(3) Family level: Parents should pay more attention to their children, increase their knowledge of their mental state and school learning life, help the school work well in safety education. Parents should strengthen their awareness of the children's consumption ideas from childhood, live in thrifty provinces, resist excessive extravagant consumption and help their children form healthy consumption habits. Most of the students are far away from the family during their reading. At the same time, parents should share their experiences with their children, learn more about their children undefined s life status and consumption demand. Meanwhile, parents should share their experiences with their children, tell the children about events around themselves, and remind the child to keep away from the parents and other institutions.

(4) Student level: Students should try hard to learn financial knowledge, enhance their awareness of risk prevention, plan their own school life, set life goals, do not spend most of their time on meaningless things, only to find goals, Not seduced by other things. To develop a correct consumption view, not to compare with others, such as luxury jewelry consumption, according to their families and peacetime living conditions, capacity and rational consumption. In order to borrow money, we must apply to the formal financial department or platform recommended by the school through formal channels, understand clearly the way of interest repayment, and stay away from the illegal campus loan platform.

ACKNOWLEDGEMENTS

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