

Informationized Management of Deviation between Budget and Final Account in China's Universities

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Abstract: In recent years, the Chinese government has intensified its development of new-and high-tech talents, thus leading to a significant increase in fiscal appropriation to institutions of higher learning. Nevertheless, the deviation between budget and final account has become increasingly prominent, which has seriously impaired the fund utilization efficiency. Therefore, how to give full play to the value of funds has been a general research interest among the academic circles studying China's construction of institutions of higher learning. In this paper, 75 institutions of higher learning directly affiliated to the Ministry of Education of the People's Republic of China have been adopted as research objects to learn the deviation status between budget and final account in Chinese institutions of higher learning. Results suggest that the expenditure deviation has been significantly higher than the income deviation in Chinese institutions of higher learning. In the following part, causes of the deviation between budget and final account in Chinese institutions of higher learning are analyzed. Meanwhile, informationized methods are used to provide improvement methods. Finally, the budget implementation link is taken as an example to build the budget and final account management system prototype under real-time monitoring at an attempt to improve the budget management efficiency of Chinese institutions of higher learning.

1. Introduction

As a tool for overall planning, budget usually plays the role of a "baton". In institutions of higher learning, budgeting should be, from the very beginning, under strict monitoring, with different departments fully performing their functions according to the budgeting rules and systems. In the implementation process, attention should be paid to real-time budgeting to avoid sudden consumption or budget slackness at the end of the year [1-2].

Budget management has a profound impact on the macro-control of the whole country. The budget and final accounts deviate from the government departments and institutions in the past, and have always been the focus area of scholars' research [3]. However, this problem does not seem to have been paid attention to in the field of colleges and universities, and the theoretical research in this area is still in the early stage of weakness, but the deviation of budget and final accounts is becoming more and more obvious. This paper deeply examines the causes of deviation from the perspective of the deviation between budget and final account, finds out the existing problems, and uses the informationized methods to put forward specific solution plans.

2. Deviation Status between Budget and Final Account in China's Universities

This paper chooses 75 institutions of higher learning affiliated to the Ministry of Education of the People's Republic of China as research objects at an attempt to gain a deeper understanding of the deviation status between budget and final account in Chinese institutions of higher learning. So far, the 75 institutions of higher learning chosen for this research have published their budget and final account information in 2017, and the data are adopted as the research samples of this paper.

Feng and Shen (2015) performed an empirical research of the deviation between budget and final account in Chinese provinces, autonomous regions and municipalities, and introduced the internationally-accepted standard of 5% to measure the reasonability of the deviation between budget and final account [4]. In other words, when the deviation between budget and final account falls under the section of -5% to 5%, it means that the budget compiled by the budget and final account department is relatively reasonable, and can be strictly implemented. On the contrary, the deviation falls outside the section, it means that the budget implementation effects are not satisfactory. If the deviation is higher than 5%, it suggests that the fiscal budget is higher than the budget amount. If the deviation is smaller than -5%, it indicates that the fiscal budget is lower than the budget amount. The sample data are imported to SPSS for descriptive statistically analysis to comprehensively analyze data characteristics. The total sample size is 76, of which 66 are valid and 10 are incomplete in data (Table 1).

Table 1 Distribution of deviation frequency between budget and final account.

N income	Valid 66	N expenditure	Valid 66
	Incomplete 10		Incomplete 10
Mean	0.0187	Mean	-0.1086
Standard deviation	0.1004	Standard deviation	0.1069
Minimum	-0.2776	Minimum	-0.3145
Maximum	0.3577	Maximum	0.3428
Deviation	0.076	Deviation	1.084
Deviation standard error	0.295	Deviation standard error	0.295
Kurtosis	2.478	Kurtosis	3.842
Kurtosis standard error	0.582	Kurtosis standard error	0.582

The deviation between income budget and final account in Chinese institutions of higher learning averages at 1.87%, which is within the internationally-accepted section, -5%~5%. This means that Chinese institutions of higher learning have implemented their income budget satisfactorily, and that their budgeting has been relatively reasonable and binding in the implementation process. However, the large standard deviation suggests that there is still a significant gap among institutions of higher learning with the income exceeding the budget by 35.77% the lowest, and the income lower than the budget by 27.76% at most. The significant intercollegiate gap is worth more attention.

The deviation between expenditure budget and final account in Chinese institutions of higher learning reaches 10.86%, which is far beyond the section of -5%~5%, and the expenditure below the budget amount is serious. More often than not, the surplus is ignored, but too much surplus means that the fund utilization efficiency is low. Besides, the fund surplus can also influences the new budget compiled by institutions of higher learning for a new year. The annual budgeting is usually based on previous experience, and budget overestimation can be easily caused, leading to a serious waste of funds.

3. Causes of Deviation between Budget and Final Account China's Universities

Causes of deviation between budget and final account are reflected in three links, namely budgeting, budget implementation, and budget monitoring. In the following part, the causes are analyzed from the perspective of system and process, and the causes behind a huge deviation between budget and final account in Chinese institutions of higher learning are pointed out.

3.1. Budgeting

Lack of scientific budgeting methods: China's fiscal budgeting is based on "zero-base budgeting". Budget management in institutions of higher learning belongs to the system, and naturally promotes the scientific budgeting method. Nevertheless, a majority of institutions of higher learning still follow the "base plus

increase” method, which makes experiential modification on the basis of previous budgeting rules. A major illness of this method is that departments at different levels might suddenly spend money vehemently for the sake of preventing shrinkage of the budget index for the next year, thus resulting in imbalance between budget and expenditure [5].

3.2. Budget Implementation

Lack of real-time monitoring for budget implementation: The rigid restriction and real-time monitoring mechanism is lacking in the budget implementation process of Chinese institutions of higher learning. Once the budget plan is issued, various departments will manage it on their own. Though some institutions of higher learning have their quarterly completion rate, there are no rigid restrictions on realizing the completion rate. In order to prevent the budget index for the next year from falling, the sudden spending at the end of year exists seriously. There are two reasons attributable to this phenomenon. First, the superior department has failed to provide real-time monitoring. Second, the budget implementation department has a weak awareness of budget.

3.3. Budget Monitoring

Lack of an efficient budget monitoring system: When efficient budget management lacks an efficient monitoring mechanism, the budget implementation efficiency might be low. Facts show that institutions of higher learning, while implementing the budget, are not under adequate restriction and monitoring. Consequently, fund use is growingly deviated from the budget objective. In some departments, expenditure beyond the budget amount is serious, while other departments have difficulty in spending the money. Lack of real-time control and timely adjustment is responsible for the imbalance between income and expenditure [6].

Lack of a budget performance assessment system: The absence of performance assessment has been a phenomenon widely existing in Chinese institutions of higher learning. The budget implementation of departments at different levels is usually not linked with their performance assessment. The budget performance assessment mechanisms in most Chinese institutions of higher learning focus on the achievement transformation only [7]. As a result, a large amount of human and material resources might be invested but with slight effects achieved. On the contrary, if the budget implementation status can be taken as one item of performance assessment, it can be ensured that the least money is spent to achieve the best effects [8].

4. Suggestions for Improvement via Informationized Means

Considering that the budget implementation is slow in most Chinese institutions of higher learning, informationized means can be used to design the budget management system. Such a system relies on the financial management system, whose main functional modules are similar to those of the latter but have added two functions to the budget implementation module. First, real-time budget monitoring, which compares the actual implementation proportion with the target implementation proportion for real-time monitoring, and enables users to learn the gap between the two and make immediate adjustment of the current budget plan. Second, comparison of integrated implementation status via charts to clearly demonstrate the implementation differences of different projects and to remind users of projects which are implemented slowly [9].

Meanwhile, comparison of integrated implementation can provide a direct display of the performance assessment mechanism, thus offering valid bases for budget distribution of the next year.

The aforesaid financial management system implements the two-level management model—at the college level and at the university level, respectively. At the university level, departments at all levels are macroscopically managed in terms of their budget implementation under different income and expenditure classifications. At the college level, microscopic management is managed, and the budget implementation is monitored according to different majors, projects and project leaders.

4.1. Construction of Budget Management System Prototype at the University Level

The budget implementation module of the budget management system at the university level can

be divided into departments, project budget, income items, and expenditure items. In the following part, the functions and operation of every interface are introduced, and the illustration is drawn according to the functional module (Figure 1).

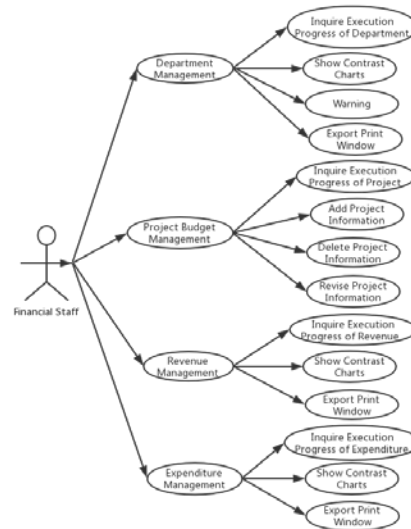


Figure 1 Illustration of budget management system at the university level.

The financial personnel in institutions of higher learning can make use of the budget management system to realize relevant functions. In the department management module, the implementation schedule of different departments including various teaching units and organs, can be checked. Through comparison between the actual implementation process and the objective realization schedule, the budget implementation status can be immediately learned. Departments which are slow in budget implementation can send out notices online through the system. The comparison statement is generated, in which the budget implementation status of different departments is directly compared based on the bar graph to facilitate the implementation performance assessment and provide the basis for budget distribution of the next year. In the budget management module, the project budget management is similar to that of the department module. The budget implementation schedule of different projects can be checked. Meanwhile, the project information can be added, deleted, modified and checked. In the income item management module, the budget implementation schedule of different income items can be checked to realize real-time monitoring and generate the comparison bar graph. The design of the expenditure item module is similar to that of the income item module, so no further introduction will be provided here [10].

In the following part, the department module and the income item module are chosen from the system for a detailed introduction. The other interfaces adopt a consistent style.

(1) Department interface design

The functional interface of the department interface (Figure 2) allows the user to check the overall budget implementation status of different departments. The basic functions include searching by the department name, department type and implementation status; exporting and printing the current interface; generating the chart according to different classification standards.

The department budget list includes the budget amount, implemented amount, frozen amount, implementation proportion, recycled budget amount, and available balance. Among them, the implementation proportion is an innovational function of this module, through which the user can observe the specific implementation schedule. When the implemented amount of different departments changes, the system will calculate the implementation proportion on a real-time basis according to the implemented amount and the budget amount following the update. This can facilitate the user's clarification of the budget implementation status of various departments. Meanwhile, the mouse can be moved to check the schedule requirement and the actual implementation schedule. The user can also click on the pre-warning button, and the system will send notices to the subsystem of different departments.

The functional interface of the department interface can generate the comparative analysis chart

(Figure 3) according to the department name and the department type. The user can directly see the comparison outcomes, including the budget amount, implemented amount and budget recycled amount, under different classification models. The statistical charts are generated on a real-time basis according to the implementation status of different departments. Move the mouse to the column to display the specific data. The statistical chart can show the budget implementation status of different departments, and can be adopted as the basis for budget distribution of the next year. When the budget implementation schedule of the current year is too slow or the budget is seriously recycled, the budget distribution amount for the department should be correspondingly reduced in the next year. On the contrary, the budget distribution should be increased for those performing well in budget implementation.

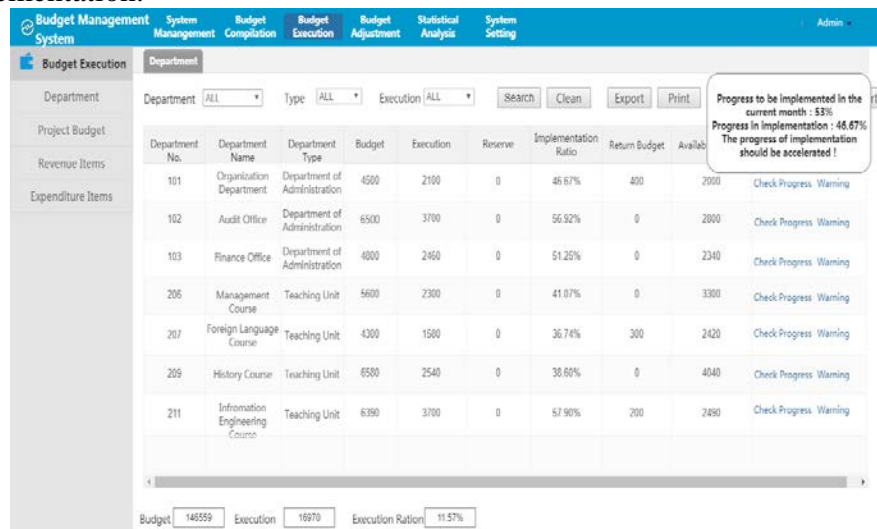


Figure 2 Functional interface of different departments.

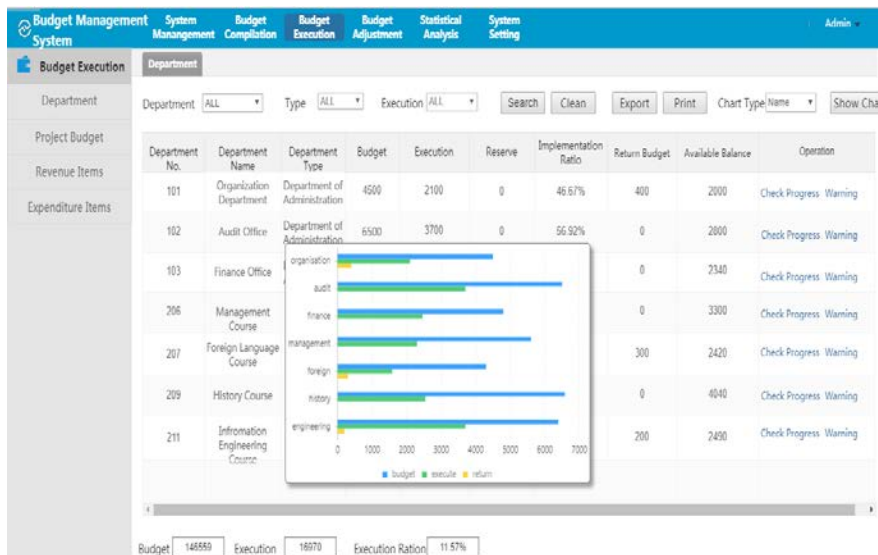


Figure 3 Comparative analysis based on the department.

(2) Income item interface design

The income item interface (Figure 4) is classified according to income functions. In other words, the overall budget implementation of different types of income can be checked based on different sources of income. The basic functions include classifying by the total income, searching by the implementation status, exporting and printing the current interface, and generating the comparison chart.

The income item budget list should be set up with the income details according to the overall income and expenditure budget list to reflect the integrated income structure of institutions of higher learning in great detail. The list should include the budget amount, implemented amount,

implementation proportion, budget recycled amount and available balance. Move the mouse to the department functional interface to check the budget implementation schedule.

The functional interface of income items can generate the comparative analysis chart (Figure 5). The user can directly check the comparison results of the budget implementation schedule under different income types, including the budget amount, implemented amount, and budget recycled amount. The statistical chart is generated according to the real-time budget of the budget implementation schedule of different departments, which allows real-time checking.

4.2. Construction of Budget Management System Prototype at the College Level

The budget implementation module of the budget management system at the college level mainly includes the project budget maintenance interface, budget implementation process interface, college checking interface, and individual checking interface. The illustration is drawn for different users to help them summarize the functional modules.

The major project budget management users are leaders of major projects. Take the dean for example, whose main function is information management of major projects, including checking major project information, newly increasing sub-project budget distribution, checking the implementation status of major projects, and modifying and deleting project information. The reimbursement management enables project management staff to increase, delete, modify or check the reimbursement information. The college-level check management is for macroscopic checking of the college-level overall budget implementation status, including checking major projects. When the budget implementation schedule is deviated from the plan, the major project leader will receive a notice, who will then check the overall fund implementation schedule at the college level. The individual checking management is targeted at individual fund users, who can check the budget implementation schedule individually. It includes checking the implementation schedule of major projects, checking the budget implementation schedule of subsidiary projects, and checking the budget implementation schedule of overall funds. The illustration for different users is shown in Figure 6.

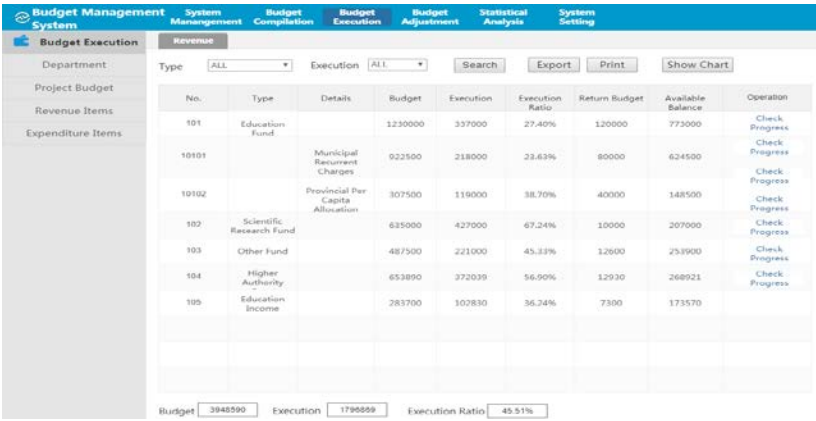


Figure 4 Income item functional interface.

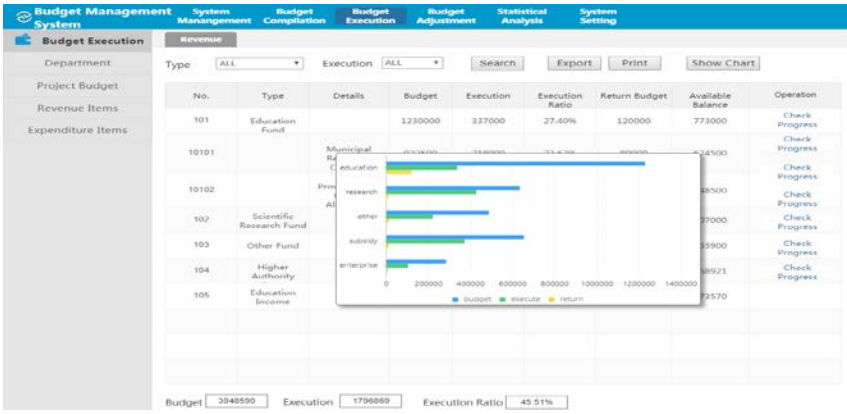


Figure 5 Comparative analysis of income items.

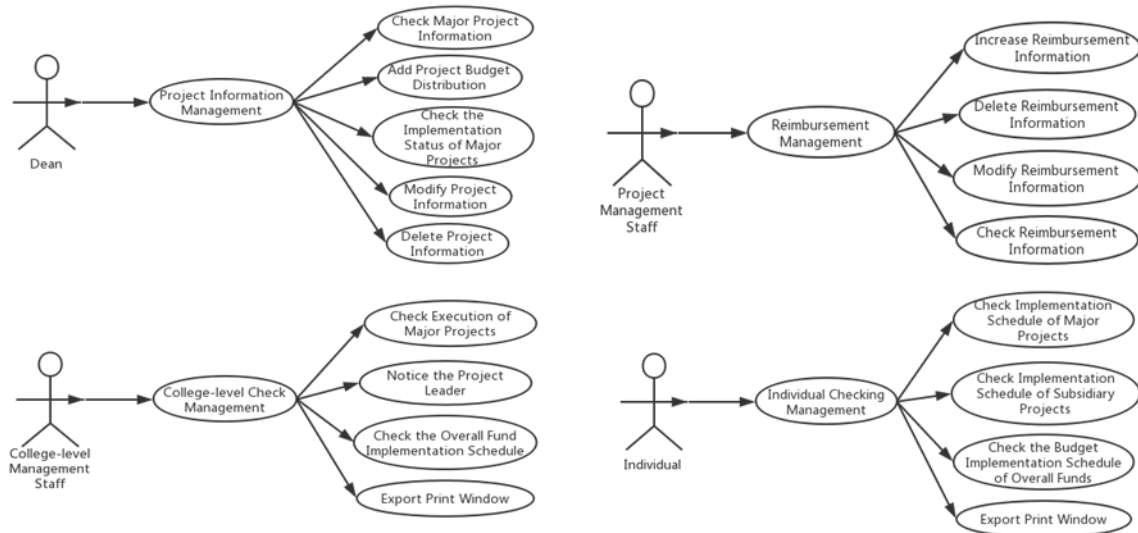


Figure 6 Illustration for the budget management system at the college level.

In the following part, the budget maintenance interface, budget implementation process interface, college-level checking interface, and individual checking interface of the budget management system at the college level are introduced in great detail.

(1) Project budget maintenance interface

The project budget maintenance interface (Figure 7) can reflect the budget implementation status of all subsidiary projects under a major project number of a university. The module users mainly refer to the major project leaders. The project leaders should allocate funds based on projects and individuals. Similar to the innovational function of the budget management system at the college level, the college system can also display the actual implementation schedule and the required implementation schedule through “checking the schedule” for users to see the budget implementation schedule of all subsidiary projects under the major project. The implementation schedule can also be viewed by searching by demands.

Budget Management System-College												
Project Info		Project Infrmation	Project Reimbursement	Individual Check	College Check	Statistical Analysis	System Setting					
Project Info		Project Budget										
Department: Management Course		Project Name		ALL	Project Manager		ALL	Search	Clean	Add	Export	Print
Project No.:112-1952201												
Project Name:Per Capita Allocation												
Project Manager:Mike												
No	Project Name	Project Manaoer	Budget	Execution	Execution Ratio	Budget Return	Available Balance	Operation				
1	Scientific Research	Mike	3000	1800	60%	0	1200	modify	delete			
2	Education Reform	Mike	3000	1600	53.33%	0	1400	modify	delete			
3	Class Building	Mike	3500	2100	60%	0	1400	modify	delete			
4	Discipline Competition	Tony	2600	1700	65.38%	0	900	modify	delete			
5	Education Reform	Tony	6720	3692	54.94%	500	2528	modify	delete			
6	Scientific Research	Kate	6300	4200	66.67%	0	2100	modify	delete			
7	Class Building	Kate	4500	2100	46.67%	0	2400	modify	delete			
4												
Budget		46572	Execution		12770	Execution Ratio		27.42%				

Figure 7 Project budget maintenance interface.

(2) Budget implementation process interface

The budget implementation process interface (Figure 8) can reflect the specific reimbursement of all subsidiary projects under a major project. This module can realize the following basic functions, including searching by the project name and reimbursement applicant, and entering the fund use situations of different projects into the reimbursement summary list. The reimbursement summary list shall include the project name, reimbursement applicant, reimbursement category,

reimbursement time, and reimbursement amount. In the reimbursement summary list, any item can be modified or deleted. The implementation status can be linked with the college information checking and the individual information checking to synchronize the budget implementation status and realize real-time monitoring.

Budget Management System-College	Project Information	Project Reimbursement	Individual Check	College Check	Statistical Analysis	System Setting	
Project Info Department: Management Course Project No.:112-1952201 Project Name:Per Capita Allocation Project Manager:Mike	Project Reimbursement Project Name <input type="text"/> ALL Project Manager <input type="text"/> ALL <input type="button" value="Search"/> <input type="button" value="Add"/> <input type="button" value="Export"/> <input type="button" value="Print"/>						
	No	Project Name	Reimbursement Person	Reimbursement Type	Reimbursement Time	Reimbursement Money	Operation
	1	Education Reform	Mike	Book Resources	2018-11-20	500	modify delete
	2	Scientific Research	Lee	Book Resources	2018-12-25	300	modify delete
	3	Class Building	Mike	Service Charge	2019-03-26	2000	modify delete
	4	Discipline Competition	Peter	Expert Counsulatation	2019-03-31	1000	modify delete

Figure 8 Budget implementation process interface.

(3) College check interface

The college check interface (Figure 9) reflects the budget implementation schedule of major projects of the college. This module can realize the following basic functions, including checking the real-time budget implementation schedule of every project category. Under the college check interface, the project number, project type, project principal, budget amount, implemented amount, implementation proportion, and available balance are included. In the check list, the implementation schedule of any project category can be viewed for real-time tracking of the deviation from the target budget. If the deviation is too high, click on “pre-warning” to send notices to the person in charge of the project.

[illegible]

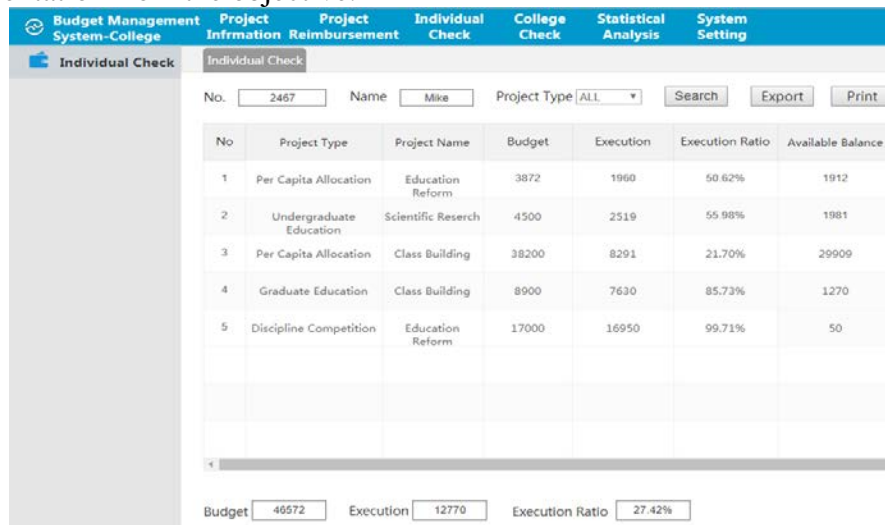
Figure 9 College check interface.

(4) Individual check interface

The individual check interface (Figure 10) can reflect the fund use of different projects individuals. This module can realize the basic functions, including searching by major project types, and exporting and printing the current interface.

The lowest part of the check list displays the overall budget implementation schedule, which can

realize real-time monitoring of overall fund uses. Meanwhile, the overall budget implementation schedule can be checked by major projects, and the project implementation status is statistically presented hereunder, and for users' convenience to learn causes of the deviation of the overall budget implementation from the objective.



No.	Project Type	Project Name	Budget	Execution	Execution Ratio	Available Balance
1	Per Capita Allocation	Education Reform	3872	1960	50.62%	1912
2	Undergraduate Education	Scientific Research	4500	2519	55.98%	1981
3	Per Capita Allocation	Class Building	38200	8291	21.70%	29909
4	Graduate Education	Class Building	8900	7630	85.73%	1270
5	Discipline Competition	Education Reform	17000	16950	99.71%	50

Budget 46572 Execution 12770 Execution Ratio 27.42%

Figure 10 Individual check interface.

5. Conclusion

In recent years, the Chinese government has gradually increased the fund allocation for institutions of higher learning, and the deviation between budget and final account has been worsening. A huge deviation between budget and final account will seriously reduce the fund utilization efficiency, which is not beneficial for long-term development of institutions of higher learning. Therefore, how to reasonably distribute funds among institutions of higher learning and give full play to the funds has been a research issue requiring immediate solution. Concerning the worsening deviation between budget and final account in Chinese institutions of higher learning, this paper provides a new solution thinking from the perspective of informationized management. The budget implementation link is taken for a case study, and a budget management system prototype is built thereon. The comparison between the implementation proportion and the required monthly implementation schedule is introduced. Real-time update is conducted based on budget implementation situations to send pre-warning information of departments or projects slow in budget implementation. Meanwhile, the statistical chart can be generated according to different classifications for a direct comparison and for the users' convenience to check the implementation schedule and find a basis for performance assessment.

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