



# Research on Internal Cost Accounting and Control of Education System Based on Activity Based Costing

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**Abstract.** In recent years, the competition among universities has become more and more fierce, and major changes have taken place in the operating environment of universities. By analyzing the problems and causes of internal cost accounting in universities, an internal cost accounting model based on activity-based costing has been established, and cost accounting has been defined. To determine the cost driver rate and operating costs, ensure that the internal cost accounting results of universities can accurately reflect the educational costs of universities, enhance the value-added ability of educational resources and the awareness of cost control in universities, and aim to continuously reduce the internal costs of universities.

**Keywords:** Activity based costing · Education system · Cost accounting · Cost control

## 1 Introduction

Cost accounting is an important part of corporate accounting work; correct cost information is an important basis for corporate decision-making. But today, in actual work, most companies make major decisions such as pricing, product mix, and process technology selection based on distorted cost information. To make matters worse, there is almost no other information that can make the management aware of the serious distortion of product costs, and only after the profitability and competitiveness have declined, the company found out that there was a problem.

Since the reform and opening up, the state has increased investment in education, especially in higher education, which has made China's higher education develop rapidly. In particular, the implementation of the strategy of "rejuvenating the country through science and education" has provided a good opportunity for the development of higher education. Due to the transformation of China's planned economy to market economy, the establishment of independent legal person status of independent colleges and universities, colleges and universities have changed from a planned economy to a market economy. Relying solely on government funding has been transformed into a multi-channel financing pattern dominated by government funding [1]. If colleges and universities want

to survive and develop in the tide of market economy, they must “open source” and “reduce expenditure” simultaneously. On the one hand, it is necessary to expand the sources of funds, improve the quality of teaching and ensure good social benefits; on the other hand, it is necessary to implement strict economy, carry out education cost accounting and strengthen management, and control unreasonable expenditures to reduce costs and improve school running efficiency.

This article establishes an internal cost accounting model based on activity-based costing, and defines cost accounting. Determine cost drivers and operating costs to ensure that the university’s internal cost accounting results accurately reflect the university’s educational costs, enhance the value-added capabilities of educational resources and the university’s cost control awareness, and strive to continuously reduce the university’s internal costs.

## 2 A Survey of Internal Cost Accounting and Control in Education System

At present, the internal cost accounting system of colleges and universities is the cost accounting system of institutions. China’s colleges and universities are non-profit institutions, and their teaching activities are not aimed at profit [2]. Therefore, at this stage, the internal cost accounting system of colleges and universities does not fully analyze the impact of cost factors on Colleges and universities. For example, the lack of education cost accounting system is the reflection of the internal cost accounting problems of colleges and universities. The evaluation index of the cost assessment system in Colleges and universities needs to be improved, which is also a prominent problem in the internal cost accounting of colleges and universities.

At present, the education cost assessment system formulated by the national and local education authorities mainly focuses on the following contents: first, the total amount of education investment index; second, the teaching quality index. The economic benefit of colleges and universities mainly refers to the amount of teaching resources input under the same teaching quality [3]. In the case of the lack of attention to the economic benefit cost index in the evaluation index, colleges and universities will show the problem of ignoring the cost in teaching management. In the case of weak cost awareness and insufficient attention to the importance of cost management in Colleges and universities, some colleges and universities may have the problem of insufficient funds, and some colleges and universities will show serious waste.

College education cost management system is not perfect, financial management lags behind. The role of the financial management department of colleges and universities is only to calculate the balance of revenue and expenditure of colleges and universities. So far, China’s colleges and universities have not established a set of systematic and reasonable university cost management system, nor have they established a control system for the prior, in-process and after event management of university education cost. As a result, there is a waste phenomenon in many links of teaching and scientific research management in Colleges and universities, which increases the operation cost of colleges and universities. At the same time, the capital management level of colleges and universities is generally low Low [4, 5]. There is no standard to measure the internal

cost control of higher education. There is no internal cost control standard issued by the state and universities, and it is not easy to establish a unified cost control standard implemented by all universities in the country because of the different school running concepts, school running levels and school running conditions.

The responsibility of cost management is not in place. The internal cost control of higher education is a complex system engineering, involving the management and control of each department. From the perspective of the overall management mechanism and current situation of China's colleges and universities, there are still problems in the implementation of management responsibilities [6, 7]. For example, in the administrative management, there are overstaffed organizations, overlapping functions, no clear scope of responsibility between various departments, no accountability for unreasonable and inaction phenomenon, resulting in low management efficiency; in the personnel management, the post setting is repeated, the responsibility sharing is not clear, and the work efficiency is low. These problems have increased the difficulty of university education cost management to varying degrees.

## 2.1 Control Algorithm of Internal Cost Accounting in Education System

Combined with the activity-based costing, this paper optimizes the internal cost accounting control algorithm of the education system, establishes  $n$  student training centers according to the current situation of college specialty setting in Colleges and universities, selects the resource drivers, and apportions the resource consumption to the student training center according to the resource drivers, so as to form the cost of the cost library. Set the cost matrix of the cost base of the student training center as  $C_0$ , as shown in the formula.

$$C_0 = [C_1, C_2, \dots, C_n] \quad (1)$$

The cost of the cost base of the student training center is divided into fixed and variable parts:

$$\Delta C_0 = C_f + C_v \quad (2)$$

Where:  $C_0$  is the student training cost of the cost library of the student training center;  $C_f$  is the fixed cost of the cost library of the student training center;  $C_v$  is the variable cost of the cost library of the student training center. Let the matrix of cost drivers of student training be  $MD$ , as follows:

$$MD = [md_1, md_2, \dots, md_n] \quad (3)$$

The calculation formula of cost driver rate of  $J$  cost base of student training center is as follows:

$$MR = [mr_1, mr_2, \dots, mr_n] \quad (4)$$

The calculation formula of cost driver rate of  $J$  cost base of student training center is as follows:

$$S = \frac{C_0 - m_r * n}{\Delta C_0 d(MR - MD)} \quad (5)$$

Where:  $c$  is the student training cost of the cost library of the student training center;  $m_r$  is the cost driver rate of the student training center;  $d$  is the amount of the student training driver. The cost of cultivating students in Colleges and universities is the cost of each student training center, which is the product of the quantity of resources consumed by the student training center and the price of resources. Suppose that the cost matrix of cultivating students in Colleges and universities is  $GC$ , the motivation matrix is  $D$ , and the diagonal cost motivation rate matrix is  $DR$ , then the calculation of  $GC$  is as follows:

$$GC = GC - S*DR = [d_i]*diag [r_1, \dots, r] \quad (6)$$

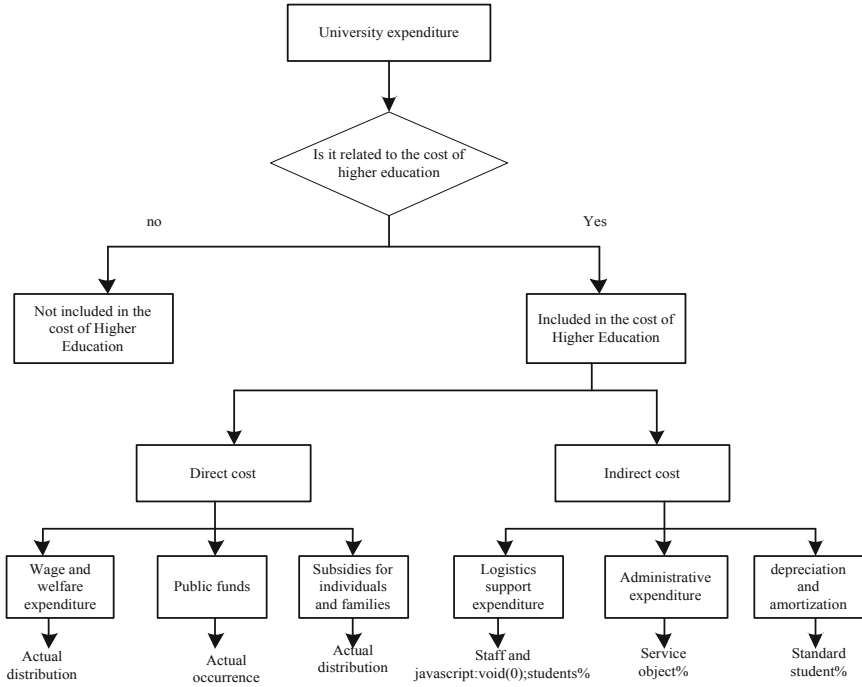
Where:  $d_i$  is the activity cost of student training center,  $r$  is the consumption cost driver,  $diag$  is the consumption cost driver rate. Suppose that the cost matrix of the materials consumed by the university training is  $L$ , the labor cost of the staff is  $P$ , and the indirect cost of the university operation is  $OH$ , then the calculation method of the cost  $CC$  of the university training students is as follows:

$$CC = L + P + OH \quad (7)$$

The organizational structure of colleges and universities is usually composed of several secondary colleges, which are further divided into several specialties. When calculating the internal cost of colleges and universities, each major can first calculate the cost of cultivating students according to their own actual situation, and then summarize it to the school by the secondary college [8, 9]. Adopting multi-level cost accounting from bottom to top can not only provide relatively accurate data information for school management, but also enable managers at all levels to distinguish value-added work and non value-added work, which is conducive to reducing invalid work, reducing internal costs, improving core competitiveness of colleges and universities, and making rational and efficient allocation and use of educational and scientific research resources in Colleges and universities .

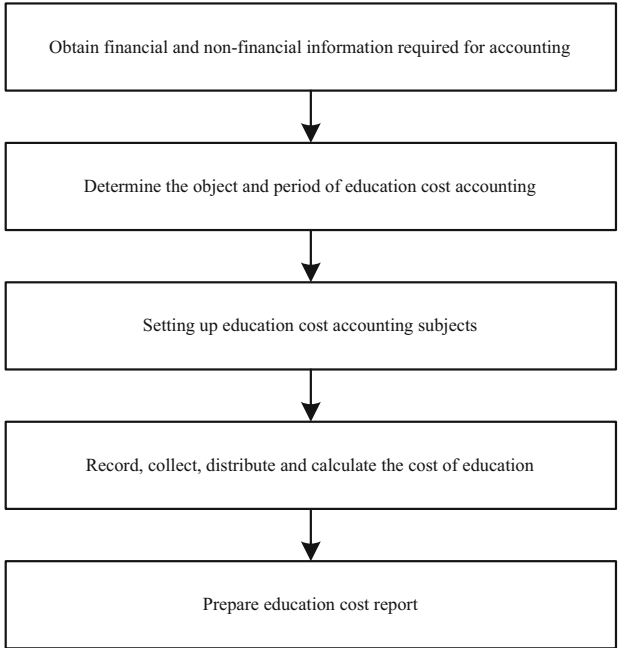
## 2.2 Optimization of Internal Cost Accounting System in Education System

The methods of educational cost accounting in Colleges and universities include the measurement and calculation methods of educational cost accounting. It is mainly based on the financial data of colleges and universities to calculate the education cost of colleges and universities. In order to make the measurement process easier, to a certain extent, it refers to the enterprise accounting method and uses accounting means to calculate, that is, the accounting adjustment method [10, 11]. In the calculation process, considering the causes of different cost items, according to different motives and beneficiaries, according to a certain standard, they are allocated to each college, so that they can be finally allocated to each cost accounting object. College education cost project is set up according to the specific situation of colleges and universities, which is used to collect various expenditures of colleges and universities, so as to calculate the cost of college education conveniently [12]. Cost items can be set according to the situation and Department of University expenses, which can simplify the accounting process of university education cost to a certain extent and provide beneficial support for the establishment of university education cost accounting [13]. To optimize the internal cost accounting system of education system, the specific system structure is shown in the Fig. 1 below:



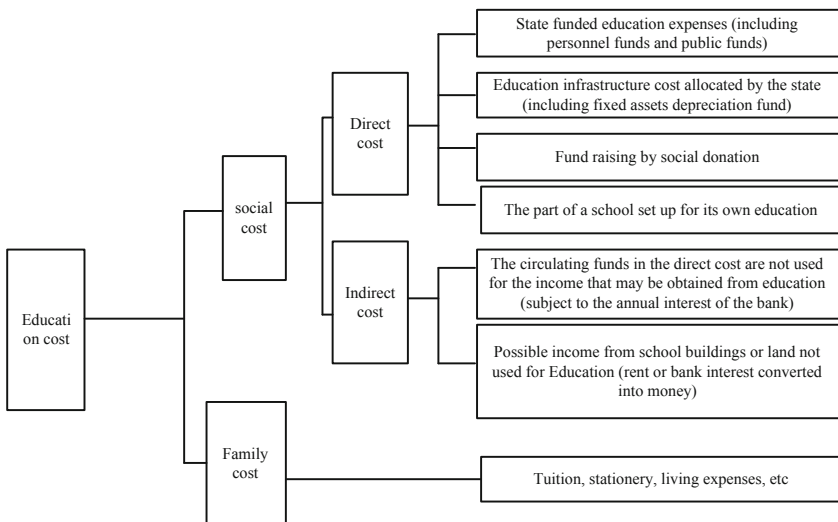
**Fig. 1.** Internal cost accounting system of education system

Because the purpose of educational cost accounting in Colleges and universities is to meet the relevant needs of the government, colleges and Society for educational cost information, it is considered that under the current conditions, the choice of accounting method for the measurement of educational cost in Colleges and universities is more valuable [14]. Under this method, China’s colleges and universities should, in accordance with the principle of accrual basis, take the current accounting data of institutions of higher learning as the basis, and according to the requirements of education cost accounting, set up separate cost accounting accounts and accounting subjects to carry forward various business expenditures, so as to carry out education cost accounting continuously, systematically and completely [15]. In order to carry out education cost accounting and provide reliable education cost information for relevant users, we must set up a set of standardized procedures, so that education cost accounting can be carried out in full accordance with the set procedures, so as to ensure the reliability of the provided cost information [16]. Referring to the enterprise cost accounting procedure, the general procedure of education cost accounting in Colleges and universities is divided into the following steps: obtaining the financial and non-financial information required by education cost accounting, determining the object and period of cost accounting, setting up cost accounting subjects, recording, collecting, distributing and accounting education cost, and compiling education cost statements. The specific process is shown in the Fig. 2 below:



**Fig. 2.** Teaching cost accounting procedure in Colleges and Universities

In the case that the cost accounting system of colleges and universities needs to be improved and the compensation mechanism needs to be optimized, the basis for carrying out the education cost sharing work of colleges and universities needs to be improved. The problem of indiscriminate and high charges in Colleges and universities is criticized by the society. Under the influence of the above factors, the optimization of internal cost accounting system and cost sharing mechanism has become an inevitable choice for colleges and universities to improve the efficiency of capital use and ensure the



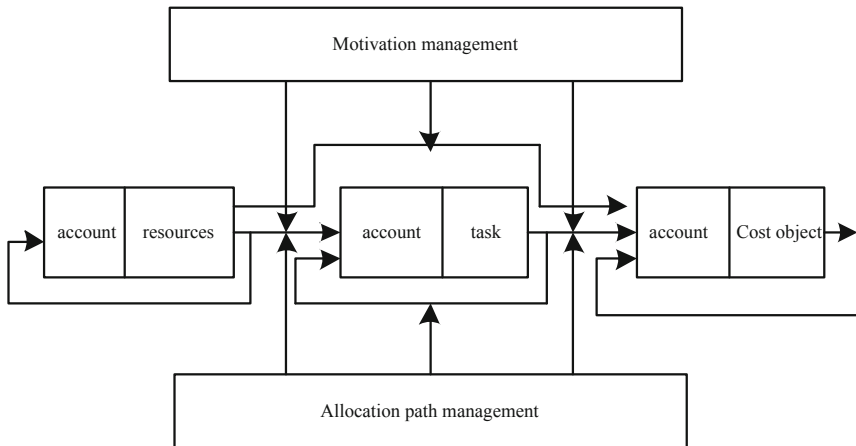
**Fig. 3.** Classification of education cost

quality of teaching. Education cost is divided into family cost and institution cost, but education cost is not equal to the sum of family cost and institution cost. Because there are overlapping contents between family cost and institution cost, such as tuition fees in family cost, as the income of school, can be used for capital investment or recurrent expenditure of school, thus forming a part of institution cost (Fig. 3).

Through the above classification, it is possible to distinguish educational activity expenditures and non-educational activity expenditures, and group educational activities into “career expenditures”. In this way, “operating expenditures”, “appropriation of funds”, “subsidy expenditures to affiliated units”, “carryover self-financing infrastructure”, etc., are classified as non-educational expenditures that are not related to educational activities. This more accurately reflects the accounting scope of education costs. Among them, teaching cost refers to all kinds of expenses related to the educational services provided by colleges and universities, which is basically the same as the teaching expenses in Colleges and universities. However, it does not include non academic education and other aspects of teaching expenditure, because such education does not belong to the scope of higher education cost accounting, but should belong to the expenditure not included in the education cost.

**2.3 Construction of Internal Cost Control Model in Colleges and Universities**

At present, the financial software used by colleges and universities in our country is not unified, and the calculation method of cost accounting in Colleges and universities is not the same, so the cost accounting in Colleges and universities has not been effectively carried out nationwide. With the deepening of the reform of financial management in Colleges and universities, the financial information of colleges and universities will gradually be open to social supervision, and colleges and universities urgently need to establish internal cost accounting model suitable for their own situation. The internal cost control model of colleges and universities is established based on activity-based costing (Fig. 4):



**Fig. 4.** Internal cost control model of colleges and Universities

To establish the cost control model of colleges and Universities Based on activity-based costing, we need five elements: resources, activities, cost objects, cost drivers and distribution path, as well as accounting period and organizational structure. The resources in the internal cost accounting of colleges and universities refer to the expenses for cultivating students, mainly including staff expenses, teaching expenses, management expenses, part of scientific research expenses, intangible assets investment, depreciation of fixed assets, etc. The resource account of colleges and universities is a series of resource sets with hierarchical structure. It realizes multiple allocation by subdividing the resource account to increase the accuracy of resource cost allocation.

Based on the theory of cost control system, combined with the production characteristics and cost management needs of colleges and universities, this paper takes the sustainable and healthy development of colleges and universities as the goal, takes the principles of “strategic orientation, full participation, equal rights and responsibilities, cost-effectiveness, and continuous improvement”, takes the Education Cost Management Committee of colleges and universities as the main body, and according to the development strategy of colleges and universities, from the macro management system, cost-effectiveness, and so on In order to improve the cost control of higher education, a long-term mechanism system should be built to realize the effective and healthy operation of the cost control of higher education. The cost control mechanism of higher education is shown in the Fig. 5.

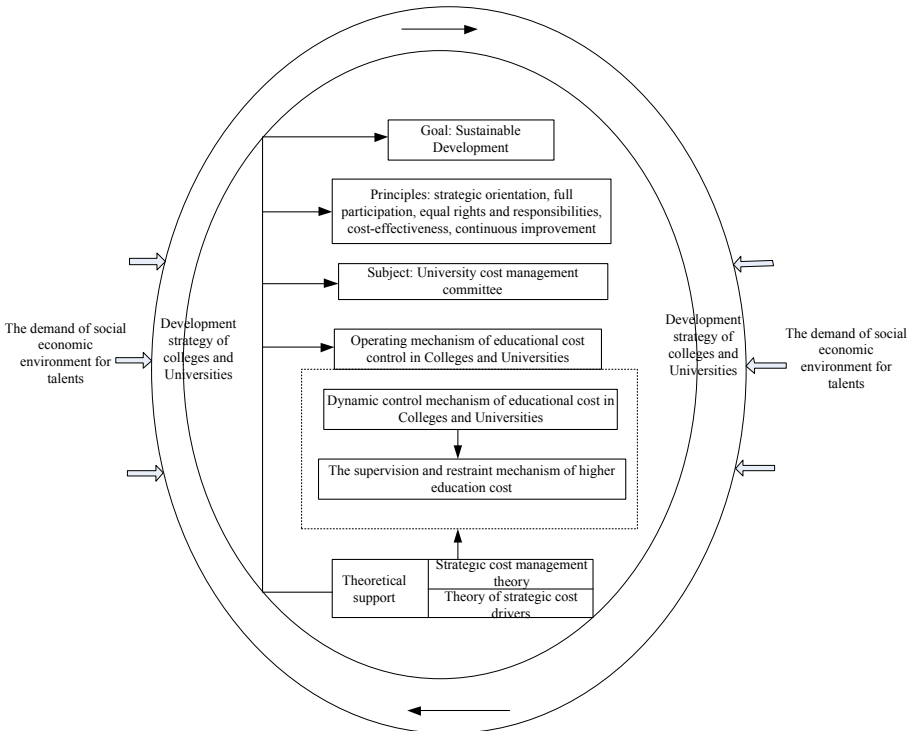
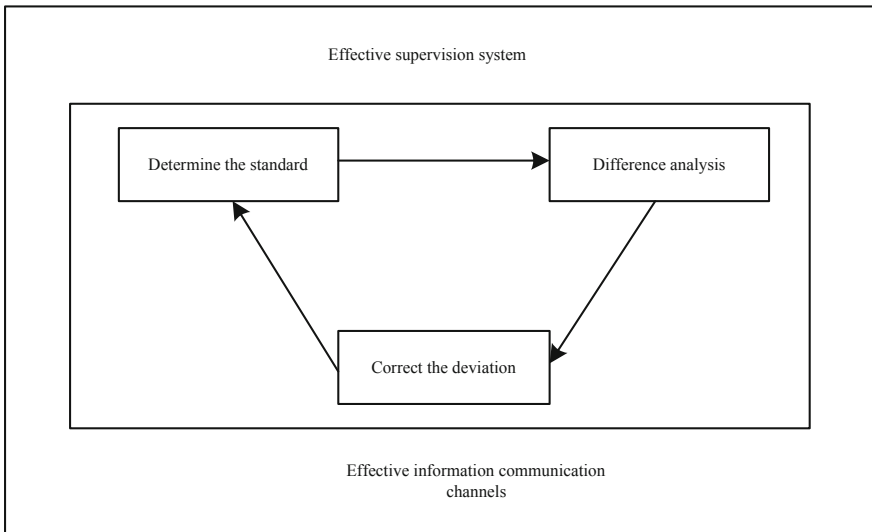


Fig. 5. Education cost control mechanism

In order to effectively control the same period, we should decompose the cost control standard determined according to the different characteristics of budget, project and operation to each department, each post, each stage and each link, so that the leaders of each department and all staff can make clear its significance, and link the cost control with their interests, so as to encourage everyone to take measures consciously and actively to control the cost. Through the effective supervision system and information communication channels, timely and accurately find out and understand the deviation in the process of education cost operation in each stage, and carry out difference analysis. The deviation should be corrected on the basis of difference analysis. There are usually two ways to correct the deviation: one is to correct the deviation by changing the objective, the other is to improve the system control ability by appropriately changing the quality and quantity of input, as well as the human, financial, material, information and system structure, so that the output can meet the target cost requirements as soon as possible. The correction of education cost deviation in Colleges and universities also includes the construction of effective information communication channels, strengthening the contact of various departments, realizing the sharing of resources and improving the utilization rate of resources. The cost control process is shown in the Fig. 6.



**Fig. 6.** Internal cost control process of education system

Teaching activities belong to the basic activities of colleges and universities. Teaching cost can reflect the level of teaching cost in the process of providing education services, and can analyze the level of resource consumption in teaching activities (Fig. 7).

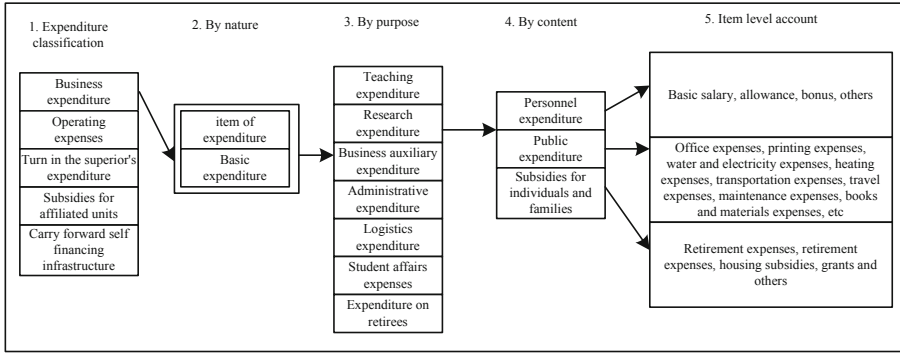


Fig. 7. Control level of University expenditure accounting

The construction of cost management evaluation system is also an important content in the process of cost management system construction. In the process of constructing the teaching evaluation system, colleges and universities can adopt the assessment system of carrying out cost assessment according to departments and departments. It is also helpful to improve the cost management system of colleges and universities to clarify the assessment indicators such as the per capita teaching expenditure and the per capita occupancy rate of books and materials, so as to ensure the research effect of effective accounting and control of the internal cost of the education system.

### 3 Analysis of Experimental Results

Taking the training cost of an undergraduate class and a master's degree of accounting major in a college of management as an example, the number of undergraduate classes and master's degree students is 23, which is referred to as group A and group B for convenience of calculation. Assuming that the school of management only enrolls one undergraduate class and one postgraduate class of accounting major in this academic year, the operation center is determined first. The school needs to train students through teaching homework, scientific research homework, practice homework and related work. After determining the activity center, collect the cost of each activity center and calculate the cost driver rate according to the accounting records of the college. According to the accounting records of the college, the labor cost consumed during the cost accounting period is 176000 yuan, the depreciation cost is 124000 yuan, the material cost is 64000 yuan, and the management cost is 36000 yuan. In order to simplify the calculation, financial expenses are included in the management expenses. Taking teaching assignments as an example, teaching assignments consume three kinds of resources: Teachers' labor, teaching materials and depreciation of assets and equipment. The management cost of the college is 25000 yuan, the wage cost is 35000 yuan, the depreciation of assets and equipment is 25000 yuan, and the material cost is 16000 yuan. The list of teaching activity cost is as follows (Table 1):

**Table 1.** Internal teaching activity cost accounting sheet

Cost classification	Cost element	Resource driver	Amount (ten thousand yuan)
Fixed cost	Management expenses	3.33%	0.60
	Depreciation of assets and equipment	33.33%	6.00
Variable cost	Labor, materials	63.33%	11.40
Total cost library	–	–	18.00

According to the same method to calculate the cost sheet of scientific research, practice and study, the total cost of each activity cost library is 140000 yuan, 60000 yuan and 20000 yuan respectively. According to the calculated cost sheet, determine the cost driver and cost driver quantity of each activity, and calculate the cost driver rate of each activity, as shown in the Table 2:

**Table 2.** Internal cost base and control factors of education system

j	Nature of operation	Cost driver	Cv	Cf	Cj	mdj	mrj
Teaching assignments	Batch level	Frequency	11.4	6.6	18.0	50	0.36
Scientific research work	Unit level	Frequency	9.8	4.2	14.0	50	0.28
Internship assignment	Batch level	Frequency	1.2	4.8	6.0	4	1.50
Study and work	Unit level	Frequency	1.60	0.40	2.00	4	0.50
Total	–	–	–	–	40.00	–	–

After further listing the cost list and calculating the cost driver rate, the activity driver rate of each assignment is counted, and the education cost of each group A and B is calculated (Table 3).

**Table 3.** Comparison of educational expenses allocation accounting and control

j	mrj	Group A (i1)		Group B(i2)	
		d1j	gc1j	d2j	gc2j
Teaching assignments	0.36	20.00	7.20	10.00	3.60
Scientific research work	0.28	5.00	1.40	60.00	16.80
Internship assignment	1.50	2.00	3.00	4.00	6.00
Study and work	0.50	3.00	1.50	1.00	0.50
Total			13.10		26.90

According to the traditional cost accounting method, the education cost of group A and group B is the same, that is, when calculating the education cost, the unit education cost is obtained by dividing the total education expenditure of colleges and universities by the number of students on campus, while ignoring the need to invest different staff labor costs and scientific research material costs when cultivating students with different academic degrees, which makes the education cost can not be reversed truthfully Reflect the actual situation. Based on the cost accounting model of activity-based costing, it is concluded that the education cost of students with different degrees is quite different, as shown in the Table 4 below:

**Table 4.** Comparison of activity-based costing and traditional methods in education cost control

Law of costs	Amortization expenses of undergraduates (10000 yuan)	Amortization expenses of postgraduates (10000 yuan)
Traditional method	20	20
Activity based costing	13.1	26.9
Difference rate	34.50%	-34.50%

Based on the above table, we can see that in the actual operation and control process of internal cost accounting in Colleges and universities, we should pay attention to avoid increasing too much workload for financial personnel in order to obtain accurate data, or the obvious increase of management cost due to too complex internal cost accounting process. It is suggested that colleges and universities should calculate the training cost of students with different degrees according to their own situation, so as to increase the accuracy of cost information and avoid excessive increase in the workload of financial personnel.

#### **4 Suggestions on Internal Cost Accounting and Control of Higher Education**

In order to reduce the cost of education successfully, colleges and universities must set up the concept of cost management among all the staff, let the staff have the sense of cost at any time, continuously innovate the teaching and management methods, improve the quality of education products, and reduce the cost of education. With the deepening of the reform of higher education system, the level of higher education cost has a direct bearing on the survival and development of the school, and on the salary and welfare of the whole school staff. A large number of colleges and universities have different degrees of funding shortage. This requires the whole school staff to change their ideas and establish a correct sense of cost.

According to the internal and external actual situation, colleges and universities should weigh the objective needs and subjective possibilities, and put forward the specific cost objectives that colleges and universities need to achieve in a certain period of time in the future through scientific prediction. That is to say, colleges and universities should

set up in advance the project cost of cultivating a college student, as the goal of the whole school staff's efforts and the measure of actual cost saving or overspending, so as to realize the prior control of education cost. All expense budgets can only be paid after the application and approval procedures before spending. Even if it is stipulated in the original plan, it also needs to be applied and approved. This is conducive to the further study of all expenses before they will occur. According to the new changes, the rationality of expenses will be determined again, so as to ensure the use effect of all expenses. To reduce the cost of higher education, we must tap the potential of existing houses and equipment, improve the utilization rate of houses and equipment, and reduce the unit depreciation. The instruments and equipment of a school are all for teaching, scientific research and production. All colleges (departments) and departments should coordinate with each other and give full play to their due role. In recent years, many colleges and universities have merged similar laboratories, especially basic laboratories, unified management, coordinated use of instruments and equipment, and achieved good results, which is worthy of reference for colleges and universities across the country.

Education cost management is divided into pre-, during and post-management. In the process of incurring educational costs, rationally controlling various educational expenditures, and striving to save various teaching and management expenses without affecting the normal order of teaching work, is a direct way to reduce educational costs. After the education cost occurs, summing up experience and lessons, revising the budget for the coming year is a remedial measure to reduce the long-term education cost, and reducing the education cost should also be forward-looking and preventive. For example, when introducing talents, it is important to consider whether the school has the basic conditions for talents to carry out work and exert their expertise, and consider the cost of brain drain caused by this. Before constructing various projects and purchasing various teaching equipment, feasibility analysis and opportunity cost analysis should be carried out. When conducting demonstrations of new majors and selection of old majors, the professional life cycle and the total cost in the life cycle should be considered. In a word, reducing the cost of education is a long-term and complex systematic project. Only by taking the system as the starting point, careful research and continuous exploration, can we really find an effective way to reduce the cost of education.

## **5 Concluding Remarks**

Cost control is a big topic, and colleges and universities are more complex, so it is difficult to carry out cost control. To carry out the research on the cost control in Colleges and universities, it can not be completed overnight. There is a lot of detailed work to do. The theory and practice of internal cost control in Colleges and universities are not mature in China, and it will be a long-term exploration work. Therefore, this paper studies the internal cost accounting and control method of education system based on activity-based costing. With the deepening of the research, the problems of internal cost control of higher education will be solved one by one, and the efficiency of running a school will be gradually improved.

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