

Activity-Based Costing Approach to Handle the Uncertainty Costing of Higher Educational Institutions: Perspective from an Academic College

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Abstract. This paper is a genuine approach to reinvest the current state of costing and develop a challenging interest to implement Activity-Based Costing (ABC) to higher educational institutions by developing a model of ABC. Higher Educational Institutions reach a far exceeding prices and a declining quality. ABC is a system which helps in tracing out the costing incurred by each activity according to its demand or frequency of activities. Thus, it helps a wide role to play at educational institutions to develop their cost management systems. This study develop a sound model for measuring costing methodology to implement to an academic college of Business Administration at Mutah University. The result of this study found an achieving ABC dominance in the institutions, providing knowledge about the useful potential allocations of resources activities and its related drivers consumptions, in order to produce a cost product. This might helps in creating and developing a knowledge of an accurate and relevant true costs of a courses which might give the students a clear view of the cost as well as a better impact to the administrative management. This study concludes with a discussion that the implications of ABC system will help in assessing an accurate and better budgetary and programmatic issues of financial devolution as well as a part of broader activity-based management in universities.

Introduction

During the last few decades, like any other industry in the business world, the growth and importance of service organizations entities,

including non-profit entities like the higher education institutions still survive in the business, despite being rising cost and declining quality. (The Council for Aid to Education, New York, 1997) had rightly stated that, “Higher Education Institutions are in a state of turmoil and fiscal crisis”. The continual increases of tuition costs, with the decreasing customer satisfaction, and lesser quality product with higher quantity concerned, makes this industry in turmoil and uncertainty. (Klir, *et al.*, 1997) defined uncertainty as a condition in which the possibility of error exists as a result of having less than total information about the surrounding environment. The modern higher education institutions reach a far exceeding inflation cost with a declining quality product. Professor David Wastbury writes in *Costing Guidelines for Higher Education Institutions* (Higher Education Funding Council – (HEFC), 1997) that “sound costing information to underpin decision – making in higher education institutions is vital, particularly as financial constraints became tighter”. At the same time, institutions with a more complex administrative structure with the increasing operating cost which consequently increases the financial stress to these industry. Institutions and academic administrators should consciously understand how they create, maintain or destroy value, by their decisions and actions. (Mike Mitchell, 1996), expressed a variety of forces involve in pressuring higher education institutes to manage their costs like – diminishing resources, increased competition, unhappy students, parents and state legislators. The Modern institutions contain the contradiction between the rigidity and discipline inherent in bureaucracies and the flexibility and innovation fostered by collegial decision-making processes and academic freedom. (Jones, 1987), expressed that this led to a confusing uncertain dilemma to the customers.

Thus, an immediate urgent need for aggressive cost reduction for internal and external service quality improvements and useful information on which to base program decisions should try to implement. In order to combat this dilemma, a process of redesigning grounded-in concepts of recognizing, reidentifying costs, and reengineering the whole processes of plans and management activities are a must. Among these techniques for reinvention, Activity - based Costing (ABC) has been the most widely adopted through other industries in recent years as (Peebles, *et al.*, 2001) states that it can be sued to support cost recovery and recharging with in the organization. A number of service firms especially

profit making organization are found implementing ABC but in non-profit firms like in higher educational institution is still lagging far behind.

Activity based-Costing (ABC): The Concept

Prior to going further in this paper, it might be necessary to know the clear basic concept of Activity - based Costing. This will enhance a clear thorough knowledge in understanding the terminology, concept, theory and activities that will frequently cited in the whole paper. Activity-based Costing was originally developed by companies to deal with the problem of product – cost subsidization in traditional costing systems (John, 1987). ABC is a product of the subsequent reinvention, reunderstanding and reorganizing the managing system. It is just a consequent product of the technological era. ABC was initially developed and employed only for – profit and product – oriented manufacturing industries, but non-profit entities like academic institutions are still far lagging behind. Only a few higher education institutions in the United States apply ABC, and these applications are limited to allocation of overhead costs such as libraries and admissions. In Great Britain, however, several universities have adopted ABC, resulting in tighter financial management and better resource allocation (Gordon, *et al.*, 1998). Functional based systems that contributed to the development of ABC theory and practice, and its essential potentiality as a public relations tool, can provide beneficial implementation in a higher education setting and suggest that it may be used to improve cost management and financial analysis. Since the largest portion of a university's budget is buying the time of people to achieve the overall mission, (Plater, 1995), express an appropriate and qualitative report to how institutions utilize their time needs outside constituents, state legislators and university administrators' valuable information.

Activity - based Costing is a sophisticated costing system, which helps in tracking out product and customers profitability and reducing the operating costs. Business want to know which of their products and services make or lose money. So, to keep in touch and control of this information, some company has embraced ABC to stay competitive in the business. ABC analyses costs at an activity level rather than at a unit level. This redesign system led to higher levels of productivity while either maintaining a decreasing cost (Mahoney, 1997). ABC provides a

reliable method of how costs are driven by the demands for activities within a process. For non-profit organization, ABC supports managers in making more fact based decision – making (Hicks, 2005, and Lapsley *et al.*, 2004), emphasizing resource allocation and cost recovery (Greene and Metwalli, 2001). ABC is used by managers to link program inputs and outcomes, improve service, describe funds use, and more recently, outsourcing and bench-marking (Kee, and Robbins: 2003; Peckenpaugh: 2000, and Ping, *et. al.*, 2003). (Cooper and Kaplan, 1987), state that ABC emerged because of a belief that the true costs of products were not known as a result of the misclassification that arises from an inadequate understanding of the actual cost drivers for most overhead costs. This technique, is a system that focuses attention on the costs of various activities required to produce a product or service (Baird *et al.*, 2004) Thus, ABC can be defined as a method of costing that presumes that costs are incurred by each activity and that products bears cost according to the demand or frequency of activities they use. Costs are assigned to products based on individual products' consumption for each activity and not on the basis of volume of production. Therefore, this system allows for cost distortion, which will be greater in business units with higher proportion of overhead costs (Baird, *et al.*, 2004).

Traditional Cost Versus Activity - based Costing

Albeit having a wide range of differences, Traditional Cost Accounting and Activity – based Costing are found widely used in practice at the manufacturing profit – making industries. At the same time, both system are assigned to cost drivers.

Traditional cost accounting system, also known as Traditional Volume – Based Costing (TVBC), focus on units of particular products. Costs are allocated using volume – based allocation measured by attributes of a unit, typically the number of direct labour hours or revenue. It ignores the activities involved in the production of a product. It is based on the assumption that volume of production is the main determinant of overhead charges. If investors are manufactures, the product cost is relatively easy to trace to production job but manufacturing overhead is not easily traced to jobs as these costs often bear no direct relationship with individual jobs or units of product (Hilton, 2005). By contrast, profit determination for products, however, remains as the pre-eminent use of ABC (Leahy, 2004).

ABC system focuses on the activities performed to produce or service cost objects. ABC does not assume that the main determinant of overhead charges is volume of production. Rather, it requires that cost should be charged on individual products' consumption on the basis of activities, involved in the production of such products. These costs are allocated from cost pools to cost objects using cost drivers to measure the activities performed and they are related to unit – level, batch level, and product level characteristics. Figure 1 shows the general models of the Traditional Volume – Based Costing System and the Activity-based Costing System, as exhibited by (Burch, 1994).

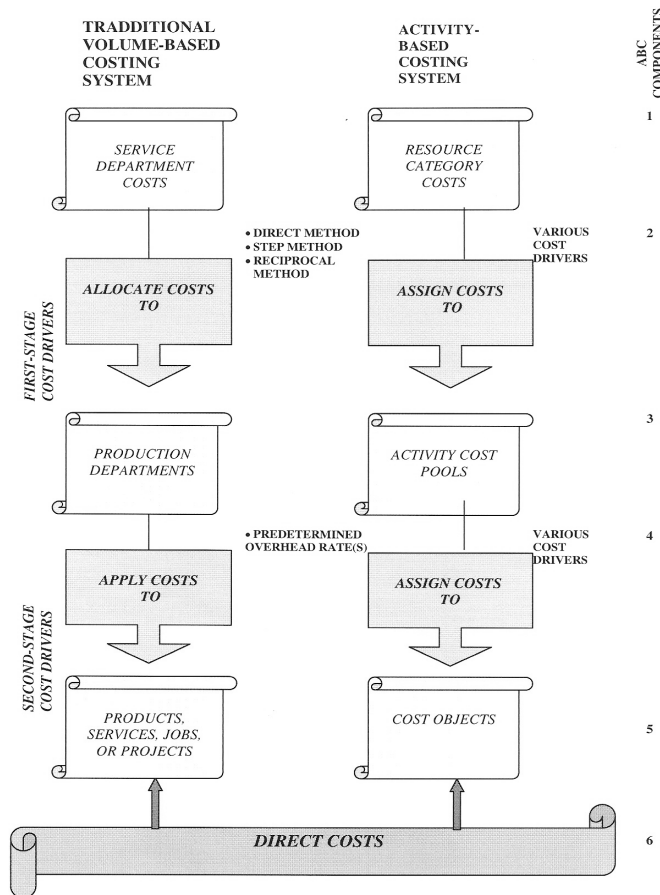


Fig. 1. General Models of the Traditional Volume – based Costing System and the Activity – based Costing System.

Review of Related Literature

Quite a number of studies have been found conducted related to Activity-based Costing (ABC), and a significant body of literature suggests that it is a useful method for determining product costs while avoiding the cost distortion that is an inherent failing of traditional methods of costing (Boonkhun, 2002; Duron, 2001; ECU, 2004, and Lere, 2000). But many of the studies were found in regarding application of ABC system to profit making manufacturing organizations. A very few studies were devoted to non-profit organization, especially with higher education institutions. Some of the studies conducted related in implementing ABC to higher educational institutions were as of (Cooper, 1998), who developed the ABC model, which assumed that cost behavior was driven by the activities performed by the department. Cost behavior activities vary significantly from subject to subject and from course to course within the same department, thus, identifying and understanding the activities behaviours is the first step in reducing costs. (Turk, 1992), states that the first step in Activity – based Costing approach was to identify the activities that were defined as being within the mission of the department. Once the activities were identified, costs could be applied to these activity centers. (Johnson, 1992), says this application may result in tracing out the expected cost per unit of activity from year to year. (Lloyd, *et al.*, 1989), also favor the ABC application in the higher education institutions by permitting the costing of education for the purpose of setting fees for fee paying students. (Acton and Cotton, 1997), suggest that application of ABC to college or university can improve cost management and financial analysis. They describe a fundamental flaw in the financial statements by not permitting the determination of the total direct and indirect costs to educate a student, but instead it represents tuition revenue generated by the course or program and expenditures for direct instruction. Thus, support costs outside the academic unit as library, computer center, admissions, financial aid, and placement are represented as fixed costs and are not allocated to the “products” consuming the resources. Furthermore, they advocate the direct tracing to assigning support service cost back to the academic units. They also suggest that the cost of student should also reflect the costs of courses taken outside of the unit, rather than just the cost of course in the academic unit. A similarly related study was conducted by (Swonger and Mead, 1998), they also implemented a program level contribution

analysis at their institution. The approach applied to indirect cost allocation is similar to that of ABC in concept and produced the predicted shift of costs from high to low enrollment programs, it continues to use a primarily “unit based” approach for allocating support costs.

Within a broader view of providing a better understanding and better management activities, (Cropper and Drury, 1996), emphasize strongly for new approaches, and new techniques to prepare and analyse the financial information despite facing drawback, from rapid changing environment, increased pressure to maximize benefits from scarce resources; senior academics and managers increasingly express concerns over the amount of time diverted to new allocation and control mechanism. Another study conducted by (Plater, 1995), concludes that most of the university’s resources are fixed, but faculty and staff time is the only variable resource. Institutions need to periodically reassess how the uses of faculty time meet the opportunities that sustain their more focused mission. (Moore, 1999), conducted a single case study at Hardin Simmons University to test whether the Activity Based Costing (ABC) or Activity Based Management (ABM) system would provide more useful information for internal management decisions than that of the existing financial accounting system. (Ernst and Young, 2000), reporting on the trial introduction of ABC into three universities: RMIT university, Murdoch University, and Charles Sturt University, asserted that the past deficiency inaccurate cost information was of little concern to the universities since they had been operating in a relatively non-competitive environment. (Blackwell and Dixon, 2003), used ABC as the initial phase of the development of a strategic management cost framework, at Monash University in 2002, in order to identify cost support service activities using an agreed cost driver. This allowed the University’s existing focus on revenue distribution to be replaced by a new focus on the management identified costs. This in turn led to improvements in value delivered and quality of service. Likewise, in 2003, Edith Cowan University (ECU) introduced ABC to assist management with information for strategic issues analysis, development of unit pricing and predictive costing” (Shane, 2005). (Krishnan, 2006), used ABC to higher learning institution to analyze how this system can improve operations and to better meet the needs of university customers in a more cost – effective manner. He concludes that it can help the university to

understand where the costs are, what drives them to occur, and which costs may be low-value-added to the cost object, therefore can help in predicting planning, cost estimation and elimination of non-added value activities. Similarly (Abraham and Reich, 2006), introduced ABC as a management tool in the higher education sector, showing a positive impact, particularly in the area of resource allocation decision – support. All these above studies found out that adoption of ABC techniques provides a better understanding and clear decision usefulness of cost information.

Implication of the Review Literature to the Present Study

Thus, it can be seen from the above review literature, the beneficial supports and drawbacks of application Activity - based Costing to higher educational institutions. Generally, higher educational institutions share a common structural and functional quality all over the world, albeit for some national structural differences. The world has been focusing considerable attention on improving the quality and activities relating the higher education. The rapid rising of the tuition costs with an opposite impact of declining quality product, pressed a constant response of redesigning through ABC. It was cited above that the most essential ingredients of cost control and in reducing cost is to understand the activity. (Norm and Peter, 1991), state that, “Activities are those actions necessary to achieve the goals and objectives of the function”. The value of activities can possibly be measured by examining internal relationships, by referring as a process costing in which the costs of activities are determined and as a product costing in which the drivers are used to trace the activity cost of the product. The unique environment in which the higher educational institutions currently operate through traditionally budgetary control of cost centers particularly comes from the resources that have been committed in advance, functional based approaches to cost management. This leads to having a deficiency of accurate knowledge of the costs of the services. Thus, it can be seen that studies done by (Turk, 1992; Johnson, 1992; Lloyd, *et al.*, 1989; Acton and Cotton, 1997; Dixon, 2003; Krishnan, 2006, and Abraham and Reich, 2006) give the similar opinion and favours in tracing out the activities cost and cost drivers for an improved financial management. Therefore, a thorough understanding of the costs and cost drivers of various programmes and activities can furnish the executive policy-

makers and responsible authorities in tracing out the relative costs of the programmes and services. This relatively can impact positive improved strategic decisions and other important value creating activity. This approach can be more programmatic in nature and can provide a better way of handling and spending the funds to mission driving programmes. In spite of all these above beneficial supports, certain drawbacks do still arise in implementing Activity - based Costing in the non-profit entities like higher educational institutions. Certain drawbacks are mentioned in the study conducted by (Cropper and Drury, 1996). And other how to reconcile an essentially centralist view of cost in Activity - based Costing with an increasing move to devolution within institutions. Howson and Mitchell, (1995) pointed out another setback as incorporating important drivers. Drivers are not formally measured. Another unique characteristic of higher educational institution was its absence of well-defined products or outcomes.

Reviewing the benefits and drawbacks of applying ABC to higher educational institutions, the researcher felt a high degree of interest and a tempting challenging effort to ensure the potentiality of ABC as an effective system used at higher education. Hence, this study is a genuine approach to reinvest and develop a challenging interest to implement Activity - based Costing in the higher educational institutions.

Importance of the Study

This study is conducted to develop a sound model for measuring costing for non-profit making entities, like higher educational institutions and to check whether this cost system provides better control over the cost in comparison with the traditional costing system. The modern higher education reaches a far exceeding inflation cost with a declining quality product. Therefore, an immediate urgent need for appropriate costing system is necessary for cost reduction at internal and external service quality and for efficient operations. It is believed that the result of this study might help in demonstrating the benefits and feasibility in implementing activity – based costing and also can furthermore support the administrators and academic administration, increase service quality to internal and external consumers, and in reduction of operating costs of the institutions. Furthermore, it can help in identifying opportunities for cost savings and provide an improved basis for budget constructions. Hence, this study provides a timely and cogent solution to some of the

problems in measuring appropriate costing system. The peculiar requirements of universities make this topic particularly important to university administrators considering the implementation of ABC (Granhof, *et al.*, 2000), therefore this study is thought to be highly imperative.

However, ABC is not an exact science and each implementation can be unique in itself. Therefore, institutions may reject, reform, modify or implement the developed methodology, as this might not be a complete working model. Albeit being an intuitive model, it can be feasible to adopt according to their own assessment or its usefulness or with institutions having the same infrastructure. And in understanding the cost and value of service activities that are essential to control escalating operational costs and provide economic benefits.

Objectives of the Study

The study emphasis is to recheck an efficient accurate costing system, by developing a sound model of measuring cost and to check its feasibility to the higher educational system, therefore, the following objectives were postulated:

- To develop a sound model for measuring costing methodology for an educational institution.
- To identify and eliminate non-value added cost by using cost drivers.
- To create a cost centre that determines the efficiency and effectiveness of all major activities performed in the university, and
- To identify and evaluate new activities that can improve the future performance of the university.

The Case Analysis

To implement the feasibility and benefits of ABC in an academic environment, the study focused on the academic Faculty of Business Administration. This Faculty at Mutah University was established in September, 1991. The Faculty was being supported by 54 teaching staffs, including the Dean of the Faculty, Deputy Dean and the Assistant Dean. 11 per cent of the academic staff hold a professorship degree, 27 per cent hold an associate professorship, 30 per cent hold an assistant professorship, 15 per cent hold as a full – time instructor, and 17 per cent

hold MBA degree. The Faculty of Business Administrations is comprised of four departments, namely,

1. Accounting,
2. Business Administration and Marketing.
3. Economics, and Finance and Banking, and
4. Public Administration,

The Faculty confers Master's degree in Business Administration (MBA), Public Administration, and Economics. The departments within the Faculty also offer various types of courses designed for students pursuing careers. The Faculty was also supported by other central services including three technology – enhanced computer centre with internet access, finance, student services and registration unit. The structural program at the graduate level needs,

- i. 31 credit hours including 22 credit hours of core modules and 9 credit hours for optional modules as University Requirements.
- ii. 42 credit hours including 39 credit hours for core modules and 3 credit hours for one optional module as a College Requirement.
- iii. 57 credit hours including 48 credit hours for core modules and 9 credit hours for optional modules as Department Requirement.

The faculty offers both required and elective courses for undergraduate students and other executive programs.

Table 1. College Expenditures by Source Academic Year 2004-2005.

Particulars	Percentage
Salary and Wages	65 %
Insurance and Compensation	18 %
Equipment and Maintenance	1 %
General Expenses	3 %
Support for Academic Research	4 %
Interest of Banks and Loans	1 %
Depreciations	5 %
Students Services	3 %
Total	100%

As summarized in Table 1, the budgeted funds are allocated from several accounts. Salary and Wages includes the salary for teaching and

non-teaching staffs, wages for workers and overtime pay, the social security, life and health insurance, saving and compensation comes under Insurance and Compensation. Equipment and Maintenance was included with stationary, cleaning, house and material maintenance *etc.*, with General Expenses includes light, phone, water, computer, center heater expenses, building insurance, advertisement and newspapers expenses, quarters rent for teaching staff. Support for research and publications, scholarship, training, conference and workshops comes under Support for Academic Research. Students Services includes the life and health insurance, and activities cost. While building, furniture, equipment and machinery depreciation comes under Depreciation, and the interest of banks and loans.

The Research Method Employed

This research is an intuitive approach to employ ABC in an academic college by developing a model for measuring costing methodology. The researcher did not find much prior work to give a proper guideline or follow-up research methods. Hence, this research was made with neither a specific hypothesis or predetermined formal research questions. Inevitably, the success of this study rely on critical evaluation of academic and support activities and on excellence understanding of accounting and budgeting processes. The aim of this study was to identify the determinants of overhead cost and to figure out ways in implementing a better efficient and effective analytical approach by not sacrificing its initial quality. Activity – based Costing is not an exact science and each implementation is unique in itself.

Data Collection

The data collection process was one of the more challenging aspects in implementing ABC system. Data must be identified, located, understood, assessed for fitting with the approach. The information needed comes from the process, which is directly related to the faculty evaluation cycle. The annual good-setting period, assigned faculty member, activities, and percentage of each time spent on each activity should be collected in a useful format assumptions and must be documented.

Data were obtained from a wide range of sources like financial affairs unit, which provides the direct college expenses according to the classification of University Budget for the year 2004 – 2005. Semi-

structured interviews were also conducted with the responsible senior staff and coordinators in order to obtain the nature of activities performed and percentage of time spent on each activity.

Development Features of the ABC Model

Concerning the fundamental complexity of higher education institutions in allocating the activities which impact on educational standards and those activities which do not, it seeks a more ascertaining realistic approach to identify and help in allocating the activities. As ABC focuses on activities and the costs of those activities, a beneficial role might be developed in applying this ABC system in the academic, non-profit institution. For better understanding and clarification of the ABC model, the following four key terms of ABC can be mentioned, *i.e.*,

- i. Identifying the resource costs.
- ii. Identifying the major activities by using cost drivers.
- iii. Creation of cost pool (cost centre) for each major activity, and
- iv. Charging the cost of activities to the products by using cost drivers.

i. Identifying the Resource Costs

At the first stage, the major activities in an organization or an institution are identified, *i.e.*, sources of costs that support activities. As illustrated in Table 2, the final board activity area of sources of costs with the combination of direct and indirect sources, including academic support, academic administration, student services, and general administration concludes with seven activities assigned to the cost object. This activities individualize the allocation of effort by identifying the separably departmental cost for each and the resource – consumption was assigned to appropriate activities using a first – stage resource driver.

ii. Identifying the Major Activities by Using Cost Drivers

The second stage was to relate the cost of each section to the academic units that consumed the activities by identifying the factors that influence the cost of a particular activity by using resource drivers, thereby forming activity pools. Resource drivers are used to describe the significant determinate resource cost to activities. It measures the

frequency of activity performed and the effort involved in carrying them out; For example, the resource driver of student support resource activity is the number of students.

iii. Creation of Cost Pool (Cost Centre) For Each Major Activity

After having allocated the cost drivers for each major activity, a cost centre is created for each activity administered to the programmes of the department. An activity cost centre is the pool of the assigned resource costs to an activity.

iv. Identifying the Cost of Activities to Products.

The costs of activities are traced to cost objects by means of activity drivers. Activity – drivers used to measure the consumption of the activity cost pools by cost objects.

But in practice the process works at cost of activities may differ significantly from one subject to another or from one course to another. This approach recognizes that not all activities resources are consumed in proportion to the number of outputs produced. Thus, an analogy of the classification of major activities in ABC system according to a hierarchy first described by (Cooper: 1990), as shown in Table 2, might be worth taking.

Table 2. Classification of Major Activities in ABC System.

Type of Activity	Definition	University Activities
Unit Level	Activities performed each time a product is delivered, for example a module	Teaching and Research
Batch Level	Activities performed each time or batch of products is delivered, for example a portfolio of modules	Courses committees assessment and validation events
Products Level	Activities which are needed to support the provision of each type of output	Faculty administration
Facility Level	Activities which sustain an organization's ability to function.	General administration and provision of premises.

Figure 2, shows a conceptual model of Activity-based Costing, for higher Educational Institutions. Designing the costing model is a challenging and critical stage in the implementation process. The first

stage is to define the resource categories at an appropriate level, in a way that it would be general enough to cover up all the areas, which are directly or indirectly assigned to the cost object. In this model, the resource categories include: faculty salaries, administrative salaries, compensation and insurance, infrastructure activities, academic services, student activities and depreciation. Cost drivers are the first link in the ABC model, and thus, these resource costs are assigned to appropriate activity cost pools by using such resource drivers as actual cost, number of square meters, number of faculty, number of students and the percentage of actual costs respectively. These activity costs pools are aggregated into activity centers, which is managed by each separate departments. The second-stage activity assign the costs from the activity costs to costs object. In other words, the activity drivers measure how often activities are performed on each type of course or student and the effort involved in carrying them out. They are the linkages between the products / services and the activities that highlight what causes cost to exist. This process was the most important step in the ABC model.

Discussions and Reports of ABC Applications in Higher Education Institutions

Based on discussions with higher education institutions, a great collection of activities are involved in bringing out a final cost product, *i.e.*, the cost of a course. The core activities constitute the overwhelming majority of the categories of instruction and departmental research, organized research, and public service. Other academic support includes the libraries, computer labs, deans and administration of the college, student services activities and general maintenance activities. In the manufacturing industries the products are usually quite visible in the workplace, that are summarized in the inventory and cost-of goods sold accounts, but in higher education, those process providing service to the external customers and the facility-level functions necessary to the existence of the institutions would be considered the final cost objects, *i.e.*, the final product. At the same time, an adequate perfect performance measure was absent and was difficult to trace out, as for example, the allocation of uses of media services. This college provides media services equipment *i.e.*, computer services including internet services, for all the student in spite of their differences in their subjects. Media services keep records for every student using equipments, but does not keep track of

the programs where the equipments were used. Thus, equipments used by accounting department could be used by an undergraduate or an MBA course. Hence, in general, the cost of the programs was allocated in proportion to number of students, according the computer usage by programs and its relative consumption.

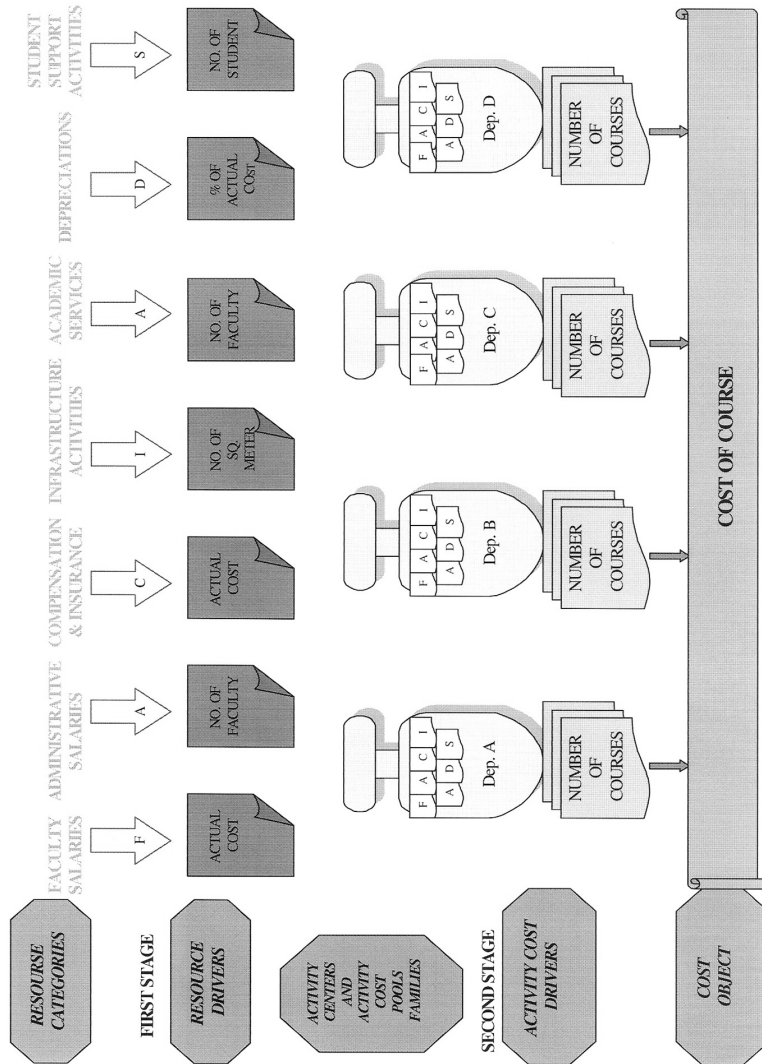


Fig. 2. Activity-based Costing Model.

The college and university department, like most academic units, was based on diverse range of factors, like the credit hours produced, sections offered, number of students, and the size of the faculty members, but in traditional cost accounting, the faculty members are assumed as the only direct cost in the instructional process.

The following are some of the simple examples, highlights the potential cost management information. It have been developed in order to assist a better understanding of the consumed resources by different proportions. Each product consumes a different quantity and variety of the college resources. Thus, it will be useful to understand the average unit cost and the standard unit cost. The first example of a useful report, *i.e.*, Table 3, examines the information with respect to the various activities and its proportional costs between two departmental units, whereas Table 4, examines and highlights the cost of a simple course.

Table 3. Activity and Cost Data - Traditional Cost.

Activities Costs	Department A	Department B	Total Activity Cost	Total Cost (JD)	Cost Per Activity
<u>Direct Cost</u>					
No. of Faculty	11	13	24		
Average Salary	17,510	19,197			
Total Direct Costs	192,610	249,561	24	442,171	
<u>Indirect Costs</u>					
• Infrastructure Activities	1,190 Sq. Mater	1,250 Sq. Meter 13 Faculty	2,440Sq. Meter 24 Faculty	59,804 23,208	24.51 /Sq. Meter
• Academic Services	11 Faculty	% of Actual Cost		69,334	967 / Faculty
• Depreciations	% of Actual Cost	734 Student	1,394 Student	52,359	37.56 / Student
• Student Support Activities	660 Student				
Total Indirect Costs				204,704.64	
Total Cost				646,875.64	
Number of Courses	148	127	275		
Cost of Courses				2,352.28	

Table 4. Cost Per Course – Activity – based Costing (ABC).

Cost Element	Cost / Activity	Department A	Department B	Activity Consumed	Total Cost (JD)
		Activity Consumed	Total Cost (JD)		
Infrastructure Activities	24.51/Sq. Meter	1,190	29,166.90	1250	30,637.50
Academic Services	967/Faculty	11	10,637	13	12,571
Depreciations	% of Actual Cost		31,778	% of Actual Cost	37,556
Student Support Activities	37.56/ Student	660	24,789.60	734	27,569.04
Salaries			192,610		249,561
Total Costs			288,982.69		357,893.31
Number of Courses		148		127	
Cost/Courses			1,952.59		2,818.06

This information highlights not only the cost associated with each of the various courses but also readily identifies the concerned activities causing additional cost, if a particular course runs highly costly. The reason for these differences between courses might be because of the differences in the size of consumption of activities between the departmental units.

Table (5), highlights the distortions of traditional costing by contrasting the two accounting methods in Tables (3) and (4).

Table 5. Distortions of Traditional Costing and ABC.

Course	Traditional Costing	Activity-based Costing	Distortion in JD	Distortion as %
Department A	2,352.28	1,952.59	(372.64)	16.03% Over
Department B	2,352.28	2,818.06	492.83	21.19% Under

In the traditional costing, costs of a course are assumed to be allocated from a single volume basis without the distinction between direct and indirect costs. It is also assumed that all the departments' courses are homogeneous in their consumption of activities resources, but in fact, it is not so. Thus, from the traditional single volume-based allocations point of view, the cost of a course is the total costs divided by the total number of courses, *i.e.*, $646,785.64 / 275 = 2,352.28$ JD. Consequently, Table 5, shows the differences of the costs of courses in different departmental units. The previous discussions, show that the variance of costs of a course arise as a result of varying resource

consumption between departmental units. The second example is the estimation of costs of a course within a departmental unit resulting from varying consumption of resources. The allocation of costs of a course revealed a strong association with the amount of effort undertaken in providing the course. This feature of costing method by providing some standard cost collection techniques from a wider range of university specific activities will provide a valuable insight for management group. In fact, the real allocation of costs of a course includes all the activities related in performing and producing the course. The pre-class activities, such as developing course design outline, preparation and post-class activities, such as grading, are all included in estimating the costs of a course. These activities consumption related to the costs of a course differ from department to department and from course to course within a department.

Table 6. Bill of Activities for a Course.

Activity Description	Activity Level	Activity Cost Drivers Description	Activity Driver Volume	Ratio in Usage	Activity Driver Volume Per Section in Hours
Course Designing	Course	No. of Hours	48 Hours	1:16	3 Hours
Preliminary Class Stage	Course	No. of Hours	80 Hours	1:16	5Hours
Conducting Course Outline	Batch Offering	No. of Preparations	8 Hours	1:2	4 Hours
Developing a Course	Batch Offering	No. of Preparations	48 Hours	1:2	24 Hours
Conducting Lecture	Batch Separation	No. Class hours	48 Hours	1:1	48 Hours
Marking of Assessing Exams	Unit	No. of Student	½ Hour	35	17.5 Hours
Counseling Sessions	Unit	No. of Student	½ Hour	35	17.5 Hours
Assessing Student Assignments	Unit	No. of Assignment	1/3 Hour	35	12 Hours
Total					131 Hours

Table (6), highlights not only the cost association with each of the various courses offered within the departmental units, but also shows the bill of activities developed for each course, and how each course consumes the various activities performed, by using time spent by an instructor as a surrogate for the cost of instruction and related activities. It also shows the variances of consumption of activities and time which consequently causes the differences of the costs of a course.

College or departmental cost reports provide adequate information as the cost of resources provided by the college. However, the information was not sufficient enough to measure how the resources consumed and how to allocate the specific groups of users, thus, the following assumptions are made to illustrate how a bill of activities can be developed for a course.

i. Average faculty salary

It is assumed that the average salary of departmental unit A and departmental unit B, as 17,510 and 19,197 respectively including the compensation benefits.

ii. Teaching load

The university counts a normal full teaching load of 12 credit hours for those holding a doctoral degree and 15 credit hours for those holding a master's degree. That is a faculty member who has no research or administrative responsibilities, are expected to teach that many load for a semester.

iii. Average distribution of faculty time

The average faculty time is assumed to be distributed as teaching, research and service with 70%, 20% and 10% respectively.

iv. Number of working hours

The average number of hours are focus is not only confined to the working duties, but is also associated with the support and responsibility of the faculty in the same general proportion. Thus, the average number of working hours, including the summer semester is, 10 months * 4 weeks * 40 hours = 1,600 hours.

v. Cost per hours

It is assumed that the average per hour cost for both departmental units are:

Department A : $17,510 / 1,600 \text{ hours} \approx 11 \text{ JD}$

Department B : $19,197 / 1,600 \text{ hours} \approx 12 \text{ JD}$

vi. Average duration of different courses is assumed as 3 hours per week over 16 weeks

vii. Class-size

The average class-size is calculated as the ratio of students enrolled in the class to total student capacity *i.e.*, 35 student per class.

viii. Number of semesters

The average number of semesters for one academic year is three semesters including one summer semester.

ix. Average non-instructional cost per student per semester as 162.5 JD

To illustrate how the ABC system works in practice and to show how resources are consumed and assigned to product according to the appropriate cost driver and the underlying behavior of the cost, activities that support a course can be classified as unit (student), batch (class), product (course) and however facility (room) – level activities can only be apportioned in some arbitrary way.

Unit – Level Activities

These activities performed each time a product is delivered *i.e.*, each time a class is taught or a students' paper is graded, as for example:

- Assessing or marking examination *i.e.*, half an hour per student or 17.5 hours for a 35 students class size.
- Counseling sessions, *i.e.*, half an hour per student or 17.5 hours per class with the size of 35 students.
- Assessing assignments, *i.e.*, one by third (20 minutes) per student or 12 hours per class with the size of 35 students.

Batch – Level Activities

These are the activities performed each time a batch of product is delivered *i.e.*, each time undertaken when a course is offered. for example:

1. Conducting and preparation time

This process includes all the activities undertaken which creates a course outlined, *i.e.*, assignments, examinations, quizzes, homework, *etc.*, *i.e.*, 8 hours per course and for per section is $8 \text{ hours} / 2 \text{ sections} = 4 \text{ hours}$.

2. Developing a course

This includes all the time spent while developing a course, as for example, updating notes, preparing notes, *etc.*, *i.e.*, 48 hours per course and for per section is $48 / 2 = 24 \text{ hours}$.

Product (course) – Level Activities

This includes the activities, which are needed to support the provision of the output, *i.e.*, course. for example:

1. Course designing

This includes activities like developing objectives or material selection, and is assumed as 48 hours. Eight times a course over four years is offered with the average of two classes at each offering, *i.e.*, 16 classes. Thus, design time per section is $48 \text{ hours} / 16 \text{ sections} = 3 \text{ hours}$.

2. Preliminary class preparation

This includes those activities like preparing class notes, selecting or learning new topics, organizing topics *etc.* and it is assumed as 80 hours for per course and for per section is $80 \text{ hours} / 16 \text{ Sections} = 5 \text{ hours}$.

Thus, it can be concluded from the Table (6) that the total time consumed for a class is 131 hours. This was calculated as the sum of the time per each activity multiplied by the quantity of activities consumed per class.

Furthermore, for a better clarification, the following information will be worth taking.

i. Instructional cost of a course per section.

Course cost / section is equal to instructors time, measured in hours, multiplied by the cost per instructor hour *i.e.*, instructional cost of a course per section:

$$= 131 \text{ hours} * 11 \text{ JD} = 1,441 \text{ JD (Department A)}$$

$$= 131 \text{ hours} * 12 \text{ JD} = 1,572 \text{ JD (Department B)}$$

ii. Instructional cost of a course per student

Course cost / student class size is the total cost of instruction per section divided by the average number of students in each section *i.e.*,

$$= 1,441 \text{ JD} / 35 \text{ student} = 41.17 \text{ JD (Department A)}$$

$$= 1,572 \text{ JD} / 35 \text{ student} = 44.91 \text{ JD (Department B)}$$

iii. Non-instructional cost per class per student

The cost of non-instruction per class per student is non-instructional cost per credit hour multiplied by number of credit hour, *i.e.*,

$$= 12.5 * 3 \text{ credit hour} = 37.5 \text{ JD.}$$

Thus, the total cost per course per student, is:

$$= 41.17 + 37.5 = 78.67 \text{ (Department A)}$$

$$= 44.91 + 37.5 = 82.41 \text{ (Department B)}$$

Table 7. Calculation Cost of Degree According to ABC Per Student for a Department.

Course	Cost Per Course	Number of Course required	Total Cost
University Requirement	68*	11	748
College Requirement	72*	14	1,008
Department Requirement	75.68	19	1,437.83
Total		44	3,193.83
Non-instructional Costs			1,300
Total Costs Per Degree			4,493.83

* These costs are assumed to show the calculation of the total cost per degree.

Table (7) highlights the cost of a Degree offered within a departmental unit of a college. It also shows the variances of consumption of activities and time, which resulted in having differences at the cost of the degree. This table divides the courses into three group requirements, according to its consumption of activities, *i.e.*, cost of university requirement, college requirement and department requirement as, 748 JD, 1,008 JD and 1,437.83 JD respectively with the total cost per degree of 4,493.83 JD.

- Student service per semester per student is 162.5 JD.
- The average student takes 16.25 credit hours (130 credit hours for 8 semesters) and to complete a degree the student has to take 44 courses or 130 credit hours for eight semesters.

Thus, traditional costing would calculate a degree’s costs by adding the average cost per course *i.e.*, 53.46 JD, as shown in table 2 and the non-instructional cost of 162.5 per semester per student.

Accordingly: (44 courses multiplied by 53.46 = 2,352.28) + (8 semester multiplied by 162.5 JD =1300 JD)

Therefore, the costs of a degree for department A and department B is

$$(2,352.28 + 1,300 = 3,652.28 \text{ JD}).$$

This may be the reason that these courses offered might have consumed more activities resources, which consequently shows the variance constant from the other subject. In the traditional costing system, it fails to consider the varied consumptions of activities needed to support a course. Creating and developing a knowledge of an accurate and relevant cost of courses, will give the consumers, *i.e.*, the student, a more clarified idea, of the cost of the course. As well as it will help the concerned administrative systems to manage a better management system.

Conclusion

The ABC system, during the recent years is considered to be significant costing innovation, practiced widely in the manufacturing profit-making industries. But, only a few studies were found devoted to the non-profit organizations like higher education institutions. Nevertheless, ABC could still have a wide role to play at educational institutions to develop their cost management systems. This paper is a genuine approach to reinvest and develop a challenging interest to implement Activity – based Costing in the higher – educational institutions. The results of this paper found an achieving ABC dominance as a costing method within the institution. Perhaps, the most critical step was to establish and define the allocations of activities for faculty and the administrative staff. The cost of an activity is an important component for every administrative management decision. Thus, developing a knowledge of an accurate and relevant costs of courses and programs with an appropriate allocations of the activities involved will help for a better and proper picture of true cost which consequently gives a better impact to the administrative management. This, approach can also help in finding a way to control the shrinking revenues, rising costs *etc.* This will allow a versatile benefits about how funds are allocated to academic divisions, and how accurate and efficiently they are used. Thus, this study is a unique approach, to explore a new area of costing management. In general, this study provides knowledge about the useful potential allocations of resources activities and its related drivers consumptions, in order to produce a cost product. Applying ABC in the education institutions can provide a number of versatile benefits in the administrative management.

- Improvement in useful cost information available to support administrative and academic programs decisions for a better picture of true cost of a program.
- Improving the service quality to internal and external customers.
- It will help in reducing costs and guides to better cost control in operating the cost of the institutions.
- It will help in better identification of areas that consumes more resources and areas that do not.

Albeit of all this useful information, cautions should be made of this paper delimitations in applying while developing ABC system in this academic unit,

- This paper delimits the duration to one academic year, *i.e.*, 2004-2005.
- The discussions and collections of data and the data assumptions were relied upon to only one academic unit *i.e.*, Business Administration College. Thus, the results and conclusions are case specific. Hence, it may encounter norm specific to that college.
- The assumptions and cost variable may vary and changes in activity with the differences of resources for other academic units. Thus, lacking for an external validity, it may not be generalizable to other academic units rather than those having a similar infrastructure.

But, however, as a cover-up conclusions, this study would shed some light in providing a basic knowledge about resource activities, and its allocations of activities driver, which may guide for other research lines.

As a follow up on this paper, some research line could be undertaken as:

- It would be encouraging to reinvest the same research programs with a longer period of time, *i.e.*, for three or four years time duration.
- Studies like implementing the ABC system for a wider area, like for a whole university.

Hence, this study concludes that ABC system is a strong and beneficial approach for non-profit service providing industries, to help in assessing an accurate and better budgetary and programmatic issue.

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مدى تطبيق نظام التكاليف على أساس الأنشطة لمعالجة مشاكل التكاليف في مؤسسات التعليم العالي: دراسة من منظور كلية أكاديمية

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المستخلص. تعتبر هذه الدراسة، دراسة أصيلة والتي انبثقت كمحاولة لتطبيق أحد الأساليب الحديثة لمحاسبة التكاليف وهو نظام التكاليف على أساس الأنشطة (ABC) على مؤسسات التعليم العالي وذلك من خلال تطوير وبناء نموذج كنواة ليتم استخدامه من قبل المؤسسات التعليمية وذلك للأهمية المتزايدة التي تحتلها تلك المؤسسات. إن نظام (ABC) يساعد الإدارة في متابعة أثر عناصر التكاليف ومراقبة تكرارها وتحليلها، وعليه فإن هذا النظام سيساعد إدارة المؤسسات التعليمية في تطوير نظام إدارة التكاليف لديها.

إن هذه الدراسة طورت لتمثل نموذجًا جيدًا لحساب التكاليف ومن ثم تطبيقه من خلال عينه مختارة تمثلت في كلية إدارة الأعمال في جامعة مؤتة. وخلصت الدراسة إلى ضرورة استخدام نظام (ABC) في المؤسسات التعليمية لبيان، وتحديد الأنشطة الخاصة بتلك المؤسسات، وموجهات كلف تلك الأنشطة بهدف التوصل إلى كلفة المساق الواحد الذي يدرسه الطالب، وكذلك الكلفة الكلية للدرجة العلمية ومقارنة ذلك مع ما ينتجه نظام التكاليف

التقليدي المعمول به، وهذا فإن النتائج التي توصلت إليها الدراسة ستساعد الإدارة الجامعية في تطوير المعرفة الكفوية الدقيقة لمخرجاتها وفي إعداد التقارير الخاصة بموازنتهم التشغيلية بموضوعية. ولذلك فإن تطبيق هذا النظام سيعطي الطالب الوضوح التام للكلفة الدراسية لتخصصه.