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A Comparative Study on Cost through ABC and the Traditional Method in the Iranian Education System; a Case Study on Hormozgan Education Department

Parvaneh Jafarizadeh[*], **S. Yusef Ahadi, Hossein Jabari**
Department of Accounting, Bandar Abbas Branch, Islamic Azad University, Bandar Abbas, Iran.

A B S T R A C T

The present paper attempts to test whether there is a significant difference between the results obtained from employing ABC and the traditional method, emphasizing the necessity of using ABC in educational institutions which are developing their activities. Hence, the costs of education for a student at various educational levels during 2003-2011 were calculated based on ABC and the traditional method. By employing ABC, the costs were dedicated through the following stages: apportionment of the costs at Iranian Education Department and the Affiliated Offices, determining the contribution of each educational level in costs of the affiliated offices using appropriate ratios, determining administrative and non-educational costs related to each level, and finally determining the educational costs of each level. For testing the hypotheses and the sub-hypotheses, paired comparison of the means and student's t distribution were employed, respectively. Concerning the migration of the educated people, i.e. the intellectual capital, the cost of emigration to other countries imposed on the society was measured using the value of exported oil resources over the years under study. It was concluded that over 121 barrels of oil by finishing high school and over 119 barrels at the intermediate technical level have been spent on each student. The total amount of costs equals to roughly 101,296,800 Rials according to the Iranian currency value back in 2000.

Keywords: Cost, Activity-Based Costing, Education System, Governmental Agencies, Students.

INTRODUCTION

The growing population of students and the rapid development in various fields of science and technology throughout the world emphasizes the necessity of devising plans for catching up with the accelerating development. Such planning requires adequate information and statistical data in order to precisely calculate the investments made in this regard.

Activity-based costing is a two-phase method leading to dedication of overhead costs to products or services. At the first phase, major activities are identified and then overhead cost is dedicated to them in proportion to resources consumed for each activity. The dedicated overhead is identified as cumulative activity cost(Anderson & Young, 2012; Pohlen, 1993). Regarding the money paid for a resource dedicated to a certain activity, the cost component and the total of cost components related to a certain activity are also defined as *cost tank*. Palanisami and Easter

[*] . Corresponding Author: prvn.jafarizade@gmail.com

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(1991), believes that cost tank does not necessarily include an activity, but it is formed by several activities classified as various groups.

In response to the information need of technical managers and engineers, Sarokolaei, Ebrati, Khanghah, and Ebrati (2012), compares, in his study titled "A Comparative Assessment of Traditional Absorption Costing and Activity-Based Costing", the traditional absorption costing and activity-based costing with a focus on responsiveness of accounting systems to information needs of technical managers and engineers in industrial and manufacturing organizations.

Concerning the structural changes and modifications in the Portuguese administrational systems, Mazzarol and Norman Soutar (1999), examined the possibility of organizing the structure of national educational institutions, so that they would achieve the highest level of compatibility with their objectives, characteristics and strategy. He argues that educational institutions need a model for understanding different costs in order to make proper decisions. This study indicates that the traditional method is not able to provide reliable information and dedicate costs, i.e. institutions demand more sophisticated systems for management and cost reduction. This study recommends utilizing the ABC system or a combinational system dominated by ABC, suggesting that a costing system can be designed based on the type of organization.

Kebede, Estifanos, and Bezabih (2015), studied the factors contributing to cost, emphasizing that monitoring authorities is not solely effective on cost reduction, but environmental factors and student performance are also effective on costs. For instance, the wage rates in the region where a school is located and poverty plaguing the external environment of the school are both effective on costs. This study suggests the most reasonable method is to use an index based on the regional conditions, arguing that policymakers and researchers, regarding the great variety of costs, need to seek solutions to measuring educational costs and applying them in educational policies.

METHODOLOGY

The present paper attempts to calculate the cost of education for a student at three levels, employing ABC and the traditional method and comparing the results. Based on the ability to trace cost through cost object, two types of cost can be identified. The first one is direct cost and the other is indirect cost. Dedication of direct cost is done through tracing and dedication of indirect cost by apportionment. The number of students at various educational levels over the examined years, the number of staff at Hormozgan Education Department including teachers, office employees, service members, tuition-paid and headquarters staff working at administrational departments, expenditures over the studied years, number of classrooms, infrastructure of classrooms are all among the data and variables in the present research.

Indirect costs are a set of factors and motives, tracing of which through costing is economically feasible. Direct costs in production include direct wage cost and direct materials. Direct costs in service-providing institutions involve only the direct wage cost. Direct cost in education, costs of educational staff and administrational personnel at each level, student capitation and costs of holding exams are also included (Obviously, these costs are directly related to students at each education level).

Direct costs are a set of constructional factors, tracing of which through costing is not economically feasible. In the present study, indirect costs consist of those reported at Hormozgan Central Education Department and the affiliated offices throughout the province, such as supplies, administrative, financial and support costs etc. (Such costs are less connected to cost objects). The total cost of the institution is achieved by using financial information as well as agreements. Such costs can be classified into three groups of materials, supplies and capital expenditure.

Over the entire years under study, educational factors (classrooms, students and staff) at elementary and primary school have been summed up and juxtaposed. The information required for hypothesis testing was gained through interview with staff, objective observation, reviewing financial statements and documents, using project management system, school IDs and their reconstruction, statistical data and budget data.

RESULT

At first, direct and indirect costs are presented in tables, sample of which is illustrated for each year in the information placed in Table 1 and 2.

The total costs achieved at headquarter centers are apportioned to primary level (35%), elementary level (25%), theoretical intermediate level (25%) and practical intermediate level (15%). (The mentioned percentages are currently applied by the budget office at the Education Department) the cost for each student over the studied period has been shown in Table 1 and 2.

Table 1. The cost of a traditional student research during the separation period

	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Primary	1677078	2245476	3259062	4544296	4360010	5508998	6395110	7004859
Guidance	2406490	2958636	4497222	6069658	572621	8605140	9507981	10348445
High school	2579300	3166719	4471024	6490225	6409811	8780423	9787721	10930071
Average Technical	4424081	4982741	7399456	9547890	9432575	12108090	15762604	15144514

Table 2. The cost difference between traditional and ABC

The traditional	ABC	di
1677078	1801223	124145
225476	2359366	113890
3259062	3374279	115217
4544396	4694867	150572
4360010	4459037	99027
5508998	5658110	149112
6395110	6603409	208299
7004859	7151395	146536

Cost measured by ABC

Examining the trend of change in cost differences through ABC and the traditional method; the first hypothesis of this study asserts there is a significant difference between cost measured by traditional method and ABC, which was previously proved.

In order to examine the second hypothesis, the cost difference was calculated through ABC and the traditional method at various levels during 2003-2011. Investigations suggest that cost through ABC at primary school over the entire years is higher than cost through traditional method. The trend curve of this difference over years 2003-2011 has been illustrated in Diagram 1.

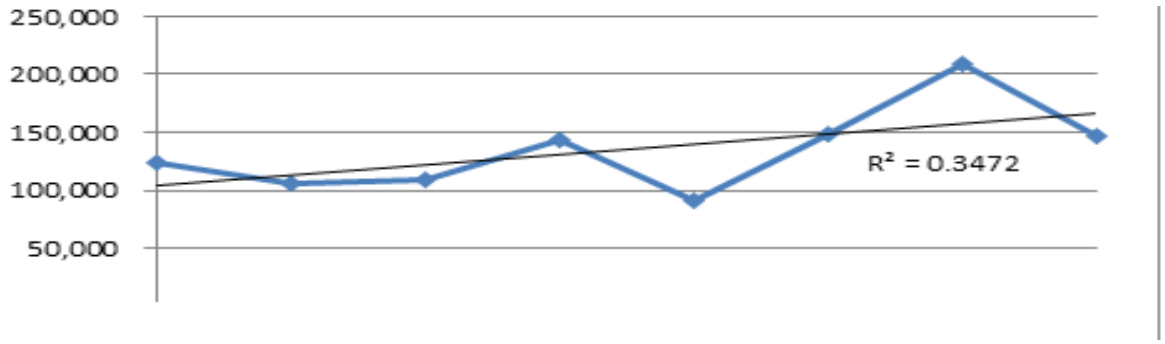

Diagram 1. The cost difference between the traditional method and ABC changes in primary

As observed in the diagram, although the trend curve is slightly upward in slope, the achieved correlation coefficient is about R=0.59. (R^2=0.3472), while the minimum correlation coefficient at significance level of 95% should be 0.666. In other words, the changing trend is not significant, making it impossible to accept the above hypothesis.

(The table for significance of correlation coefficient illustrates the degree of acceptable correlation at level 99% and 95% regarding the degree of freedom (n-2) (Appendix A-60))

Also at elementary level, similar to primary level, the cost measured by ABC is higher than that measured by the traditional method. A parallel study was done on the elementary level, where the correlation coefficient (R) was achieved to be 0.397, indicating there is more dispersion of the points, implying that the correlation is not so significant. (Diagram 2).

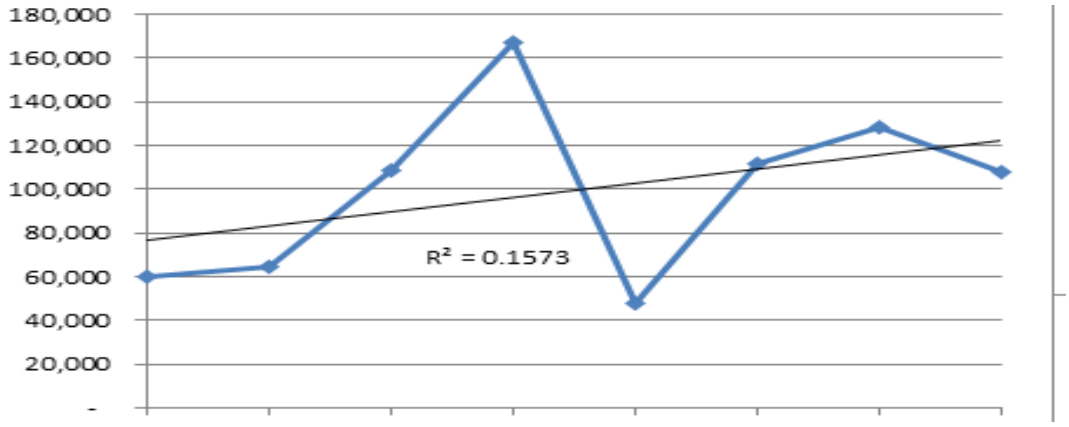

Diagram 2. The difference between traditional and ABC cost trends in Guidance

Examining the values of cost for a student through ABC and the traditional method at theoretical intermediate level against primary and elementary levels suggest that the achieved values measured by traditional method is higher than those measured by ABC over the entire years (except 2008). Furthermore, the overall change trend, unlike primary and elementary levels, goes downward (Diagram 3).

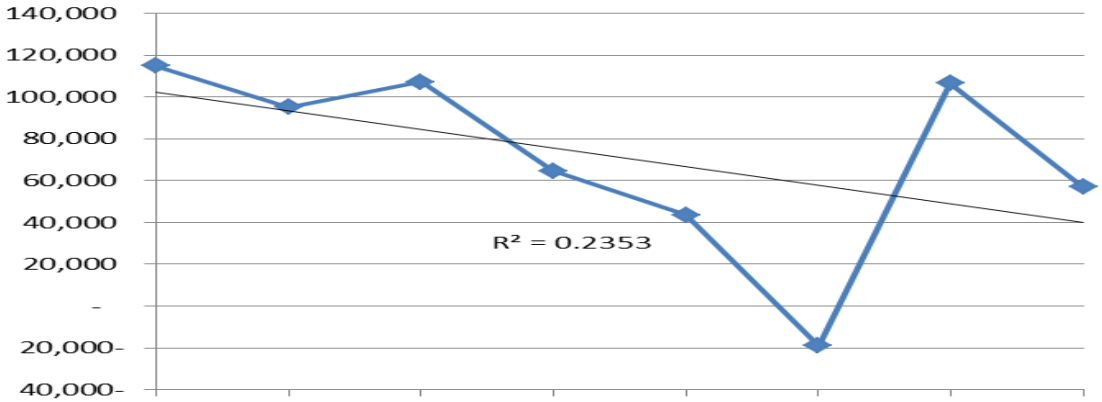

Diagram 3. The difference between traditional and ABC cost trends in High school

Examining the values of cost for a student measured by ABC and the traditional method at theoretical intermediate level against primary and elementary levels suggest that the achieved values measured by traditional method is higher than those measured by ABC over the entire years (except 2008). Furthermore, the overall change trend, unlike primary and elementary levels, goes downward (Diagram 3), while the dispersion is intense like the above education levels and the achieved correlation is not significant (the correlation coefficient was measured at 0.485).

With regard to the technical/practical intermediate level, similar to the theoretical intermediate level, the values achieved through traditional method is higher than those achieved by ABC. The examination regarding other educational levels was also done for the technical intermediate level, where the correlation coefficient (R) was achieved to be 0.481, indicating there is more dispersion of the points, implying that the correlation is not so significant. (Diagram 4).

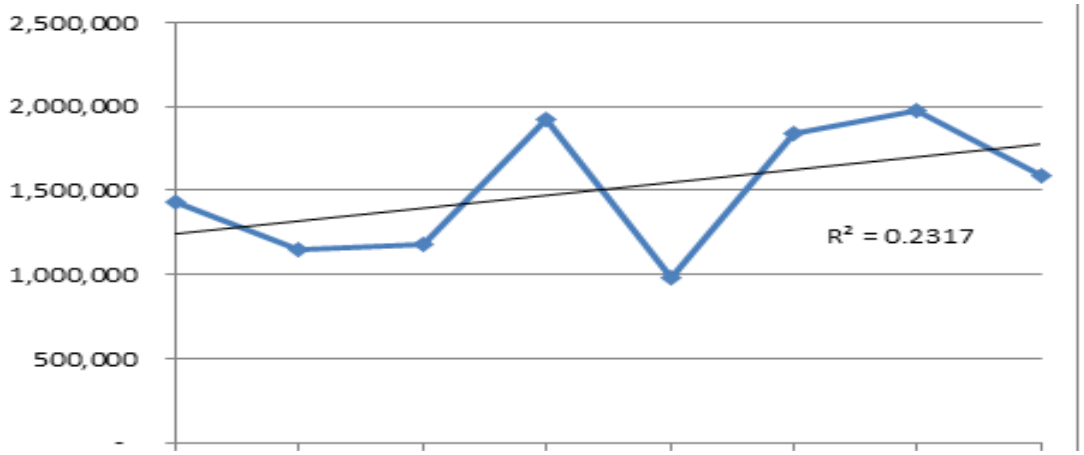

Diagram 4. The difference between traditional and ABC cost trends in Average Technical

As it can be seen, the difference at this level is greater than all other levels, i.e. the traditional-ABC mean ratio at primary, elementary, theoretical intermediate, and technical intermediate levels are 0.96, 0.978, 1.02 and 1.02, respectively. In other words, the traditional method used at primary level is averagely 4% lower than ABC. It is averagely 2% lower than ABC at elementary level, while it is averagely 31% higher than ABC. The difference at technical intermediate level, however, is averagely 31%.

In case ratio of the two methods (i.e. the ratio of cost measured by traditional method to that measured by ABC) is employed instead of the trend of values obtained from subtracting the two methods, the correlation coefficients become significant. The second hypothesis (growing trend in difference), however, is rejected; because the ratio of traditional-ABC at primary level ascends from 92% in 2003 (beginning point) up to 97% in 2000 (ending point), i.e. the curve follows an upward slope, implying that difference percentage has decreased from 8% in 2000 to 3% in 2010. In other words, their relative difference during the studied years is fading.

At elementary level, the difference between ratios is comparatively less. The lowest ratio is 0.967 associated with 2003, while the highest ratio is 0.989 associated with 2007. The percentage of difference between the two methods varied from 3.3 to 1.1, and the trend of relative difference is decreasing (Diagram 5).

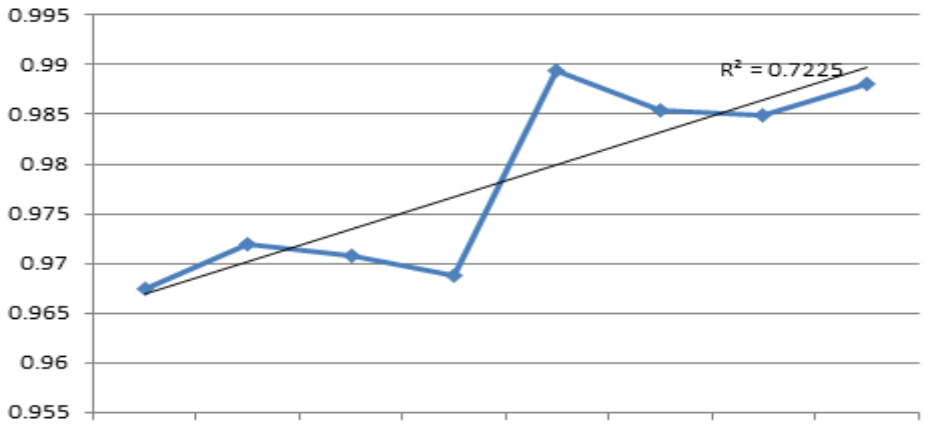

Diagram 5. ABC trend compared to the traditional Guidance

At theoretical intermediate level, the trend of ratios obtained by the two methods are descending from 1.05 to approximately 1, which indicates a reduction of difference in values obtained by the two methods over years. The minimum and maximum difference in ratio varies from 5.7% to 0.03% (Diagram 6).

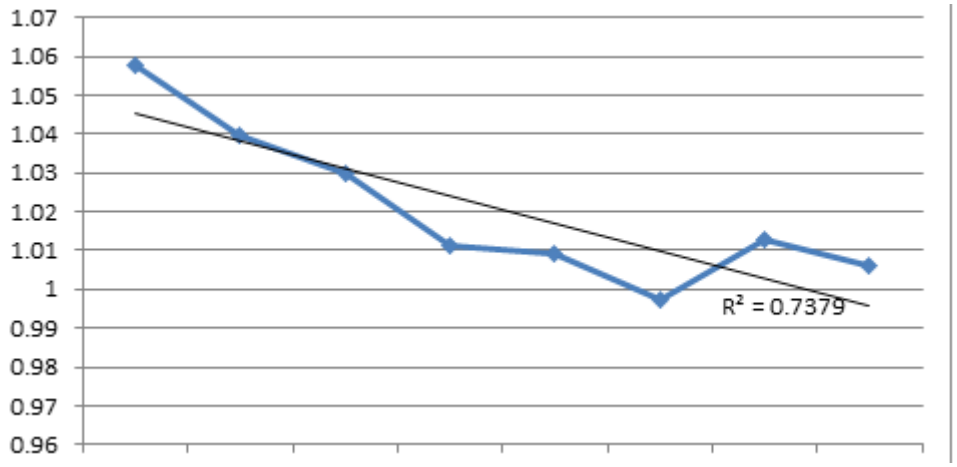

Diagram 6. ABC trend compared to the traditional High school

At the technical intermediate level, the relative difference is decreasing. In other words, the values obtained by difference between the two methods over the studied years have gradually drawn closer to each other, except that the relative difference between the two methods has intensified at this level and the ratio varies from 1.64 to 1.16. The relative difference between the two methods dives from 64% down to 16% with the curve following a downward slope. In spite of a great difference, the values obtained from the two methods are getting closer to each other (Diagram 7).

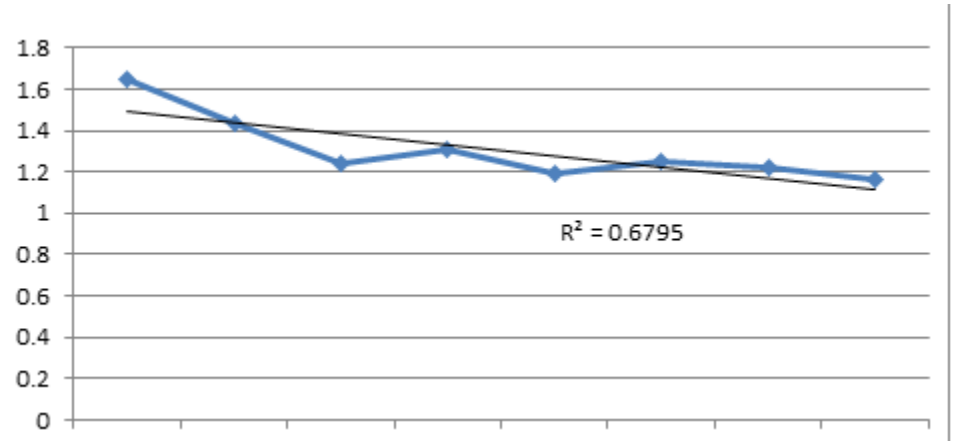

Diagram 7. ABC trend compared to the traditional Average Technical

Regarding the conducted analyses, the second hypothesis is rejected. Originally, ABC used to focus more on production environment aiming to precisely determine the production costs, which include direct materials, direct and overhead wages. The costs of material and wage are directly dedicated to product, while overhead or indirect costs cannot be traced to a product. In general, the total costs untraceable to a circle or an activity center are called indirect costs, which should be dedicated to other circles and activity centers. The degree of arbitrary dedication of indirect costs is so high that reliance on the obtained results, in some cases, might lead to making wrong decisions.

In traditional method, the overhead costs are dedicated using a predefined overhead ratio or some other basis. Adherence to the traditional system can bring about some difficulties, since the cost calculated by this system cannot represent the resources consumed in production-related activities. The traditional system in institutions providing various services such as education is unable to correctly determine the cost, because such system does not take into account the specific characteristic of each service or product in apportionment of costs, leading to improper dedication and miscalculation of prices. The traditional method employs a certain apportionment basis for dedication of various costs. Using a fixed basis for different products and services by overlooking the specific characteristic of each product and service in the traditional method and using distinct bases with regard to activities in ABC as well as removal of activities without added-value leads to inconsistency in the results obtained from employing the two methods. In the present study, it was proved there is a significant difference in using the method of calculating cost as stated in the main hypothesis and the sub-hypotheses.

CONCLUSION

Calculation and comparison of cost through ABC and the traditional method suggest there is a difference between the results obtained by the two methods. Employment of ABC indicates the fact that the entire activities performed by the end of intermediate level are identified and the cost of each is calculated. By this procedure, the activities without added-value are removed, so that the actual cost is determined. By employment of ABC, the activity centers are divided, making it possible to precisely calculate the cost, so that better decisions would be made concerning budget and credits. There are several reasons behind rejection of the second hypothesis, including poor utilization of advanced equipment's in the education field, impossibility to cut down on manpower, and in turn, difficulty in affording direct wages of the workforce.

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