Performance assessment of high schools in Nour Abad Mamasani city by using data envelopment analysis (DEA)

Saeed Ahmadi
1Department of Management, Kohkiluyeh and Boyerahmad Science and Research Branch, Islamic Azad University, Yasouj, Iran

Hamide Ranjbar (Corresponding author)
Department of Mathematics, Yasouj Branch, Islamic Azad University, Yasouj, Iran

Gholam Sajadeikhah
Department of Management, Yasouj Branch, Islamic Azad University, Yasouj, Iran

Abstract

Performance assessment is a fundamental requirement in the face and compatibility with developments and continuous improvement activities. Schools with the main task in training manpower required of society and job opportunities are not excluded. Each of the performance evaluation models are a device which after the implementation can be provided various information for decision makers. The aim of this study is evaluate the performance and public high schools ranking in Nour Abad mamasani city in natural sciences major. In this study, we were done performance evaluation and public high schools ranking in Nour Abad mamasani city in natural sciences major by using mathematical model of data envelopment analysis as an output oriented model and use of GAMS software in a time period of 2012-2014 years. In this model, we considered four input variables include: per capita budget for schools, teaching experience of teachers in levels of third- and fourth year in natural sciences major, academic degree of teachers in levels of third- and fourth year in natural sciences major and grade point average of second-year students, and three output variables include: grand point average of final examinations for third- year students of natural sciences major, grand point average of final examinations for fourth- year students of natural sciences major and the number of admitted students in the state university entrance examination. 11 high schools were studied that 7 schools were efficient and four educational groups were inefficient. Efficient high schools ranking is done by Peterson and Anderson ranking method (AP) that Shahed, Amir Kabir, Farhangian, Hazrat-e Maryam (1), Shohadaye Mamasan, Fatamiyeh and Shahid Motahari high schools were ranked respectively from first to seventh as efficient units.

Keywords: Performance, AP ranking, Data envelopment analysis, Public high schools.
Introduction

Private and governmental organizations, schools and universities cannot be evaluated by past performance evaluation criteria that are often financial criteria and based on accounting systems. Because first, the aim of this organization is not for profit and secondly, their financial resources is not provided from sell goods or services (Martin, 2013).

Nowadays, one of the methods in performance evaluation that used a lot, is Data Envelopment Analysis that is the source of research in operation, Data envelopment analysis is a method to compare and evaluate the relative efficiency of Decision Making Units which have multiple same inputs and outputs such as schools, hospitals, Banks, etc. (Kevin, 2004)

Since today one of the main indicators to measure the development of countries, is the share of a society in the production of knowledge, evaluate the performance of education systems and thus improve their performance has been more important. A dynamic educational system is need to evaluate for confrontation with any change (Naderi et al, 2013). Private and governmental organizations, schools and universities cannot be evaluated by past performance evaluation criteria that are often financial criteria and based on accounting systems. Because first, aim of this organization is not for profit and secondly, their financial resources is not provided from sell goods or services (Martin, 2013).

An important point in measuring the performance of public services is that usually resulting output from service activities cannot be easily converted into numbers (Faghhi, 1998). In addition, these sectors because are provided by the public budget, and their outputs should be accountable to the community and audiences (Bazarghan, 2000 and Heydari-Neghad, 2004).

Data Envelopment Analysis is one of the methods of performance evaluation that it can help to determine efficiency of educational centers, efficiency rank of educational centers, reference patterns of inefficient units, efficiency rate of utilization educational centers from the available resources, determination new inputs and outputs in inefficient units, and finding causes of inefficiency of educational centers (Naderi et al, 2013).

In terms of experimental researches and utilization of decision making of Data Envelopment Analysis and its applications in the educational system, back more than three decades. Data Envelopment Analysis is used in different fields ranging from evaluating the performance of local government, public sector, insurance, hospitals, banks, education and research (Burgess and Wilson, 1996, Worthington and Dollery, 2000, Husain et al, 2000, Tagi et al, 1993). In fact, the widespread application of data envelopment analysis in different fields of this method was used immediately to assess the performance of public schools in America (Charlz et al, 2008).

Research questions

1. What are the efficiency rate of high schools in Nour Abad Mamasani city in the each of indexes of average of final examinations of third-year students of natural sciences major, average of final examinations of forth-year students of natural sciences major and accepted of fourth-year students of natural sciences major in national University Entrance Exam in natural sciences major?
2. Is there a difference between the effectiveness of different schools?
Research literature

Performance evaluation: In common theories of management, targeting and performance measurement plays a significant role that this role in terms such as “Anything have been done, can be be measured,” is expressed (Taticchi, 2009).

According to importance of the issue, various methods for measuring the company's performance has been offered that one of the most useful of these tools can be noted to Balanced Scorecard, organizational excellence patterns, Performance Pyramid, Macro Process Model, Performance Prism. Managers are used to evaluate the performance of their organizations that among the most important of these criteria can be noted to following cases (Maxham, 2009).

Effectiveness, performance, quality, profitability, productivity, quality of working life and creativity and innovation. It should also be noted that each organization uses different criteria for evaluating their performance that it depends on goals and organizational strategy and model used to evaluate the performance.

This is development method of Farrell theory that was presented for measurement of the performance of units based on one input and one output in 1957 and it was not useful in the evaluation of performance of similar organizations with multiple input and multiple output. Farrell were divided performance into two types of technical and allocative. For example and based on chart (1-2), a unit when is technically efficient that is placed on similar production curve (efficient frontier curve). In other words, it may be used to produce a given amount of output from minimum input. In this mode, technical efficiency is equal to unit, that’s mean based on chart 1, if the unit is placed outside the q production curve, C would be inefficient. And the degree of technical efficiency of unit is calculated as OC' / OC. Also allocative efficiency is calculated as 'OC"/OC. And indicates the location of unit on the curve. Finally, economic efficiency is obtained by either multiplying technical efficiency with allocative efficiency and it is equal to OC"/OC (Nakanishi & Falcocchio, 2004).

Figure 1: Efficient frontier curve
The concept of efficiency:

According to Katz and Kahn (1978), efficiency is ratio of produced output to necessary data to produce this output. These two researchers distinguished between actual and potential performance (Colombier, 2008).

Potential efficiency show that how an organization can produce, if it were done as optimal. While actual efficiency is real ratio of outputs level to a level where is for production actual data (Daft, 2001). As a result, we can be defined the efficiency to amount of achievement of each economic units to the optimal production level. And its quantity rate is achieved by ratio of current production rate to potential production (Mehregan, 2013).

Data Envelopment Analysis method:

In recent years, in many countries, different applications of data envelopment analysis (DEA) has been seen to evaluate the performance of institutions, and other common activities in different fields. DEA word means Data Envelopment Analysis by a mathematical programming model to evaluate the efficiency of decision making units which has multiple inputs and multiple outputs (Mehregan, 2013). Data envelopment analysis for the first time was developed by Charnes. In development of decisions and management and it is also effective in obtain unexpected processes in theory and logic and extensive applications in the ranking all scientific aspects (Charnes et al, 1978). Data envelopment analysis is a linear programming method that proceeded to made border of efficiency by using data from organizations and production units as decision making units. This border can be made by data in the form of inputs and outputs and based on the results of successive linear programming and in fact, degree of inefficiency of each decision making unit is to distance of mentioned units to border efficiency (prasada Rao et al, 2003).

CCR model

This model has constant returns to scale and trying to choose the optimal weight for input and output variables of under study units, increase a fraction of efficiency of this unit (zero unit), in a way that efficiency of other units do not exceed from one level. The model has been proposed in two patterns of input and output and in three forms of fractional, multiple and cover. Then, we expressed different forms of input oriented. It was elected to this paper, with cover form due to the characteristic of cover form by input oriented CCR model. Therefore, in this section, we only discuss to describe form of input oriented CCR model. In Data Envelopment Analysis dual multiple form will result usually in cover form. In the event that we write dual multiple form of CCR, cover form of CCR can be obtained as follows:

$$\min \theta + \epsilon \left[ \sum_{i=1}^{m} S_i^- + \sum_{r=1}^{s} S_r^+ \right]$$

s.t

$$y_{rp} = \sum_{j=1}^{n} y_{rj}\lambda_j - S_r^+, \quad r = 1, \ldots, s$$
\[ \theta x_{ip} = \sum_{j=1}^{n} x_{ij} \lambda_j - S_i^- , \quad i = 1, \ldots, m \]

\[ \lambda_j \geq 0 \quad j = 1, \ldots, n \]

\[ S_r^+, S_i^- \geq 0 \quad r = 1, \ldots, s , \quad i = 1, \ldots, m \]

\[ 0 \leq \theta \leq 1 \]

**BCC model**

A set which in principles is include observation, convexity, feasibility and minimum interpolation, we show by \( T_v \) or \( T_{BCC} \) and is defined as follows:

\[
T_v \left\{ (x, y) \left| \begin{array}{l}
\sum_{j=1}^{n} \lambda_j x_j \geq y \leq \sum_{j=1}^{n} \lambda_j y_j \quad \text{and} \quad \sum_{j=1}^{n} \lambda_j = 1, \lambda_j \geq 0
\end{array} \right. \right.
\]

The only difference with \( T_c \) is adding formula of \( \sum_{j=1}^{n} \lambda_j = 1 \).

**Input Oriented BCC Model**

Suppose that \( n \) is decision making unit of \( DMU_j \) by input vectors of \( x_j \geq 0 \) and \( x_j \neq 0 \), output vectors of \( y_j \geq 0 \) and \( y_j \neq 0 \). The following model should be done for measuring relative performance of \( DMU_o \).

\[
\begin{align*}
\text{Min} & \quad \theta \\
\text{S.t} & \quad (x_o \theta, y_o) \in T_v
\end{align*}
\]

According to the structure of \( T_v \), equation (2-4) becomes as follows.
This model is known to Input Oriented BCC Model or cover BBC model. It is observed that this model is same cover CCR model that formula of \( \sum_{j=1}^{n} \lambda_j = 1 \) is added to it. This model also can be done constantly and it has finite optimal (Jahanshahlo, 2013).

Dual of this model that is a multiple model is as follows:

\[
\begin{align*}
\text{Max} & \quad U^T Y_O + U_O \\
\text{S.t} & \quad U^T Y_j - V^T X_j + U_O \leq 0 \quad j = 1, \ldots, n \\
& \quad V^T X_o = 1 \\
& \quad U \geq 0, V \geq 0
\end{align*}
\]

Output Oriented BCC Model

Cover form of Output Oriented BCC Model is as follow:
Dual of this model that is a multiple model is as follows:

\[
\begin{align*}
\text{Max} & \quad \varphi \\
\text{S.t.} & \quad \sum_{j=1}^{n} \lambda_j x_j \leq x_o \\
& \quad \sum_{j=1}^{n} \lambda_j y_j \geq \varphi y_o \\
& \quad \sum_{j=1}^{n} \lambda_j = 1 \\
& \quad \lambda_j \geq 0, \quad j = 1, \ldots, n \\
& \quad \varphi \geq 1
\end{align*}
\]

Definition 1: \( DMU_O \) in BBC model is strong performance, if \( \theta^* = 1 \) and all auxiliary variables in all optimal solution are zero.

Definition 1: \( DMU_O \) in BBC model is weak performance, if in input oriented \( \theta^* = 1 \) and in an optimal solution, minimum one auxiliary variables is positive or in output oriented \( \varphi^* = 1 \).

Andersen and Petersen model (AP)

Andersen and Petersen were provided a big performance model in 1993. They were done for ranking \( DMU \) s by removing target \( DMU \) from the set, possibility of producing and implementing
DMU model, they achieved for the remainder DMUs, one point ranking. This model that is known to AP model, is as follows:

\[
\begin{align*}
\text{Maxz} &= \sum_{r=1}^{s} u_r y_{ro} \\
\text{S.t.} & \\
\sum_{i=1}^{m} v_i x_{io} &= 1 \\
\sum_{r=1}^{s} U_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} &\leq 0 \quad j = 1, \ldots, n, \quad j \neq 0 \\
U_r &\geq 0 \quad r = 1, \ldots, s
\end{align*}
\]

Its dual is as follows:

\[
\begin{align*}
\text{Min} \theta & \\
\text{s.t.} & \\
\sum_{j=1}^{n} \lambda_j x_{ij} &\leq \theta x_{io} \quad i = 1, \ldots, m \\
\sum_{j=1}^{n} \lambda_j y_{rj} &\geq y_{ro} \quad r = 1, \ldots, s \\
\lambda_j &\geq 0 \quad j = 1, \ldots, n, \quad j \neq 0 \\
S_i &\geq 0 \quad i = 1, \ldots, m \\
S_r^t &\geq 0 \quad r = 1, \ldots, s
\end{align*}
\]

AP model has two problems:
A: AP model in input oriented for DMUs models with zero input, may be impossible.
B: AP model could not have an exact evaluation for DMUs in input oriented with data near to zero and also DMUs which have data near to zero.
Methodology

This study is trying to find suitable answers to these questions: 1. What are the efficiency rate of high schools in Nour Abad Mamasani city in the each of indexes of average of final examinations of third- year students of natural sciences major, average of final examinations of forth- year students of natural science degree and accepted of fourth- year students of natural sciences major in national University Entrance Exam in natural sciences major? 2. Is there a difference between the effectiveness of different schools? The data collection stage is the beginning of a process in which the researcher collect data from the field and library. Then researcher pays to the summarization of the results via classification and data analysis. The present study in terms of issue is a applied research which shows application of a quantitative method to evaluate the performance of public high schools students in natural sciences major in Nour Abad Mamasani city from Fars province. Also, research in terms of strategy is an applied research and in terms of goal is a descriptive research. In terms of time, research is a continuous study that it considered students information from a period of high school until when they enter higher education at public universities. This information is relating to 2012 year until Esfand 2014. We expressed type and amount of inputs and outputs and provided for the calculation.

Definition and measurement of study variables

We use by mathematical programming method in solving issues of Data Envelopment Analysis that will have a large number of variables and connectors and it has no problem about limitation of the low numbers of input and output in other methods.

Research statistical population is the number of adults, public and private high schools in Nour Abad Mamasani city that it is 30 high schools at the present time.

According to study and analyzing, we choose 11 public high schools as categories in the given period for entry into higher education in natural sciences major from 2012 to 2014 years.

We use data analysis software that one of the software available in the market for this method is GAMS.

Data analysis

Research stages analysis

Type of research is descriptive analytical and it is done as the field and library. Period of study was 3 years (2012-2014) and location areas of study were public high schools of Nour Abad Mamasani city that in this time frame were teaching third- and fourth year of natural sciences major in high schools. Data used in this study consisted of several categories, including per capita budget for schools, teacher’s academic degree who teaching third -and fourth year students, teacher’s experiences in teaching third - and fourth year students, grade point average for third- year and fourth- year students of high schools and also their grade point average for second- year and the number of admitted students in the state university entrance examination which was collected by visiting the Department of Education.

The variables related to teachers, experience was considered by the average of teaching period of teachers of every school (in year), and academic degree variable was as percentage of those having
academic degree from total teachers of schools. Cost figures are considered as million dollars according to its great. Also student’s grade point is calculated as the average for each school. In this study, the variables are divided into two categories: 1. Input variables, 2. output variables.

Input variable is a factor that by its increase, keeping constant other factors, performance is reduced and also, by its decrease, keeping constant other factors, performance is increased.

Input variables include: 1. Per capita budget of school, 2. teaching experience of teachers in levels of third - and fourth year of natural sciences major, 3. Academic degree of teachers in levels of third- and fourth year of natural sciences major, 4. Grade point average for third- year students.

Input variable is a factor that by its increase, keeping constant other factors, performance is increased and also, by its decrease, keeping constant other factors, performance is decreased.

Output variables include: 1. Grand point average of final examinations for third- year students of natural sciences major, 2. Grand point average of final examinations for fourth- year students of natural sciences major, 3. the number of admitted students in the state university entrance examination.

After determining the input and output parameters for each of the public high schools under study, data was collected, and enter the model and its analysis is performed. Pattern of some indexes were a type that we could not use collected data for next analysis and studies. Therefore, the final data for analysis were obtained and used by extracting the appropriate information and calculation of indexes based on data collected. Finally, the final indexes were calculated with numerical rate of them that the final form for use in data envelopment analysis models for under study high schools is shown in table 1.

Table 1. Input and output rates of high schools of Nour Abad Mamasani city.

<table>
<thead>
<tr>
<th>Students in the state university entrance</th>
<th>Admitted students</th>
<th>GPA2</th>
<th>GPA3</th>
<th>GPA4</th>
<th>GPA1</th>
<th>Average of teaching experience of teachers x6</th>
<th>Average of academic degree of teachers x3</th>
<th>Average of each school x1</th>
<th>Average of per capita budget for each school x2</th>
<th>DM U</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1.61</td>
<td>1</td>
<td>1</td>
<td>3.06</td>
<td>1</td>
<td>3.07</td>
<td>6</td>
<td>000</td>
<td>2</td>
<td>Fate miyye</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.52</td>
<td>1</td>
<td>1</td>
<td>3.21</td>
<td>1</td>
<td>3.98</td>
<td>8</td>
<td>000</td>
<td>2</td>
<td>Same n alesame</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>.81</td>
<td>1</td>
<td>1</td>
<td>.73</td>
<td>1</td>
<td>0.2</td>
<td>4</td>
<td>000</td>
<td>2</td>
<td>Shah id Motahari</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.52</td>
<td>1</td>
<td>1</td>
<td>3.21</td>
<td>1</td>
<td>3.98</td>
<td>8</td>
<td>000</td>
<td>2</td>
<td>Zawar Samen alaem</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.9</td>
<td>1</td>
<td>1</td>
<td>4.54</td>
<td>1</td>
<td>5.8</td>
<td>6</td>
<td>000</td>
<td>2</td>
<td>Shah id Izadi</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.61</td>
<td>1</td>
<td>1</td>
<td>5.8</td>
<td>1</td>
<td>6.5</td>
<td>2</td>
<td>000</td>
<td>2</td>
<td>Hazrat e Maryam</td>
<td></td>
</tr>
</tbody>
</table>

http://www.ijhcs.com/index.php/ijhcs/index  Page 234
Then, we measure BBC at the output oriented of public high schools in Nour Abad Mamasani city with having input and output values and according to the assumption of variable returns to scale.

We calculate school performance after collecting data. Calculation of performance according to the variable returns to scale model at the output oriented is done by using GAMS software. Performance values are shown in table 2.

Table 2. Performance values in public high schools of Nour Abad Mamasani city in BBC-O model

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Performance</th>
<th>DMU</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Shohadaye Mamasani</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Fatemiyeh</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Farhangian</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Shahid Motahar</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Shahed</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Amir Kabir</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Hazrat-e Maryam (1)</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>0.9812934</td>
<td>Samen alaemme</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>0.976157</td>
<td>Hazrat-e Maryam (2)</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>0.974816</td>
<td>Zawar Samen alaemme</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>0.937954</td>
<td>Shahid Izadi</td>
<td>11</td>
</tr>
</tbody>
</table>

According to table 2, performance for BCC-O model is effective in 7 units include Shohadaye Mamasani, Fatemiyeh, Farhangian, Shahid motahar, Shahed, Amir Kabir and Hazrat-e Maryam (1).

According to table 2, efficient units cannot be rank by using classic model of Data Envelopment Analysis because all efficient units have performance number of one. Thus, we use Peterson and Anderson method for ranking Decision Making Units. It gives us performance of efficient units as the most efficient and it will be done as accurate ranking.
Public high schools ranking of Nour Abad Mamasani city by using Peterson and Anderson method (AP)

In evaluating performance of organizations, the most important goal is ranking units based on rates of importance. Considering that the Data Envelopment Analysis method divided under study units into efficient and inefficient units. If the score of performance is one, it is efficient, and otherwise it is inefficient. And superiority of efficient units is not specified towards each other and it is necessary to know superiority of an efficient unit to other efficient units, because of we can make better decisions. One of the ways that will help us in this matter is Anderson and Peterson method (AP) in 1993 that it is one of the acceptable approach in the field. In BCC model, units which are placed on the efficient frontier, they have maximum performance equal to one. In this case, under study unit is placed as their assessment basis. But it rejects model proposed by Anderson and Petersen, and reference to decision making unit for this unit. The general approach of model is ranking on change rate of created efficiency frontier from removed the under assessment unit. In evaluation by AP method, under study unite is removed from evaluation. Basic model to evaluate every decision making unit from own decision making unit is used to create their own unit. Because of inefficient unit is not effective in the formation of inefficient frontier, therefore, their removing from the evaluation will have not influence on inefficient frontier. And their technical performance will not change even in ranking model by AP approach. But efficient units that form the efficient frontier, their removing will cause deformation of efficient frontier. Rate of change caused by the removal of efficient unite on efficiency frontier in AP approach, in fact, it is a criteria for ranking efficient units among themselves. Performance number allocated to efficient units in the AP rankings is greater than or equal one. In output pattern, remaining amount of difference in resulted performance number from the implementation of AP model shows increase the value in output that with an increase in output, decision making unit stays also efficient. Thus, in this model, every decision making unit which can be achieved higher performance number, among efficient units has high performance. Therefore, for ranking model and data, the implementation and analysis will done by using GAMS software and AP model based on BCC model. In this method, we enter target model into GAMS software and we run AP ranking model. So that software removes selectively the limitations of each of efficient units and calculates new performance of units.
Table 3. Efficiency of public high schools of Nour Abad Mamasani city by using Peterson and Anderson method (AP)

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>DMU</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.473933</td>
<td>Fatemiyye</td>
<td>1</td>
</tr>
<tr>
<td>0.981293</td>
<td>Samen alaemme</td>
<td>2</td>
</tr>
<tr>
<td>1.348267</td>
<td>Shahid Motahari</td>
<td>3</td>
</tr>
<tr>
<td>0.974817</td>
<td>Zawar Samen alaemme</td>
<td>4</td>
</tr>
<tr>
<td>0.937954</td>
<td>Shahid Izadi</td>
<td>5</td>
</tr>
<tr>
<td>1.674413</td>
<td>Hazrat-e Maryam (1)</td>
<td>6</td>
</tr>
<tr>
<td>1.989028</td>
<td>Amir Kabir</td>
<td>7</td>
</tr>
<tr>
<td>0.976157</td>
<td>Hazrat-e Maryam (2)</td>
<td>8</td>
</tr>
<tr>
<td>2.392</td>
<td>Shahed</td>
<td>9</td>
</tr>
<tr>
<td>1.794412</td>
<td>Farhangian</td>
<td>10</td>
</tr>
<tr>
<td>1.937064</td>
<td>Shohadaye Mamasani</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 4. High schools ranking by using Peterson and Anderson method (AP)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Girls public high schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shahed</td>
</tr>
<tr>
<td>2</td>
<td>Amir Kabir</td>
</tr>
<tr>
<td>3</td>
<td>Farhangian</td>
</tr>
<tr>
<td>4</td>
<td>Hazrat-e Maryam(1)</td>
</tr>
<tr>
<td>5</td>
<td>Shohadaye Mamasani</td>
</tr>
<tr>
<td>6</td>
<td>Fatemiyye</td>
</tr>
<tr>
<td>7</td>
<td>Shahid Motahari</td>
</tr>
<tr>
<td>8</td>
<td>Samen alaemme</td>
</tr>
<tr>
<td>9</td>
<td>Hazrat-e Maryam(2)</td>
</tr>
<tr>
<td>10</td>
<td>Zawar Samen alaemme</td>
</tr>
<tr>
<td>11</td>
<td>Shahid Izadi</td>
</tr>
</tbody>
</table>
Conclusion

According to the stated goals of this study and the results of data analysis by using BCC-O model, performance rate of high schools in natural sciences major, seven high schools were efficient that the performance of all of them was equal to one and four high schools include Samen alaemme, Hazrat-e Maryam (2), Zawar Samen alaemme and Shahid Izadi were inefficient.

For inefficient schools was considered a reference collection that they will reach to the maximum performance by making model of efficient schools. As can be seen from table (4-5), in general, Fatemiyeh School for three times, Shahid Motahari school for four times and Shahed school for one time were used as a reference collection.

As can be seen from table (4-6), inefficient units were ranked, but efficient units because of having evaluation number of one, they were not ranked by software available. We have ranked units by using Anderson and Peterson model that according to the results, Shahed, Amir Kabir, Farhangian, Hazrat-e Maryam (1), Shohadaye Mamasan ,Fatemiyeh and Shahid Motahari schools were ranked respectively from first to seventh as efficient units and Saman alaeme, Hazrat-e Maryam (2), Zawar Samen alaemme and Shahid Izadi schools were ranked respectively from eighth to eleventh. According to the near of per capita budget values, teaching experience of teachers and academic degree value of teachers to mean values in our schools mentioned, reasons of their low efficiency should find out in the type of training methods and school specific rules.

Suggestions

- Performance assessment and efficiency measurement should be comprehensive and it includes financial and non-financial aspects.
- The most important criteria in each dimension can identify and make sure that their influence on performance evaluation.
- The method of performance evaluation is important up to the self-assessment of performance.
- Centers that have been successful performance, they encouraged that will be a practical pattern for other centers.
- The strengths and weaknesses of centers can identify and declare to them and to use them as opportunities and threats and their performance review to improve their performance in a positive direction.
- A unit will be created as a statistic center in every center and a unit for the whole province in the provincial capital that next researchers will be able to have a comprehensive census for research.
References

-Bazargan, Abas, (2000). Internal suitable approach for continuous quality improvement educational groups at the University of Medical Sciences, Psychology and Educational Sciences, Tehran University, Forth year, no 2.


