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Descriptive performance assessment of elementary students using fuzzy TOPSIS

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Abstract

This article evaluates the descriptive performance of students in one of the primary schools in Babol. Since most of these indices are offered qualitatively to evaluate students, the results may sometimes not provide the right solution. Therefore, in this article, the qualitative data are converted into quantitative data by using fuzzy method. Then, the students' performance is ranked using fuzzy TOPSIS technique. However, this study shows that in spite of quantitative data, when all the criteria are the same for some students in a particular context, they offer a similar ranking of alternatives. In this study, the ranking of 30 students in the sixth grade of Babol elementary school is determined by 8 criteria for average score, discipline, timely attendance, assignments, responsibility, concentration, academic achievement and legality. The results show that 9 students are ranked first and they need to be ranked again by other criteria.

Keywords: Multiple Criteria Decision Making; TOPSIS; Fuzzy; Fuzzy Weighted Average.

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1. Introduction

One of the important educational issues that has been discussed in elementary schools for several years is the discussion of descriptive evaluation. Descriptive evaluation involves the process of collecting data, analyzing information and interpreting it through various educational methods, including tests, reviewing student assignments and activities, and so on.

The purpose of this type of education is to provide useful and effective descriptive feedback to guide students toward the realization and achievement of higher academic goals. The basis of work in this type of evaluation is based on obtaining information through which the teacher can improve students by identifying weaknesses, strengths and finding problems in the learning process, so that by evaluating the information obtained, he can make appropriate decisions in class. To do this action allows teachers and students to have the opportunity to make favorable changes in the process of their activities in appropriate situations and move towards a better realization of educational goals and expectations.

In this type of education, instead of using grades from 0 to 20, the academic progress report is considered as a whole and the structure of the student's report card is changed to be less competitive and more flexible.

In the report, which is presented to parents on the basis of descriptive evaluation, instead of a list of course grades, the student's academic progress is presented in the form of a description of his biography. It is noteworthy that the reports presented to the parents do not only talk about the student's academic status, but also analyze and discuss various emotional, physical, social and mood aspects of the student. In this way, parents receive a complete report on the various psychological and academic aspects of their child, which is very valuable and can help parents to correct the student's weaknesses. Every educational method has its advantages and disadvantages, if we want to mention the advantages of descriptive evaluation, we can mention the following

1.Better more detailed and deeper understanding of the student.

2.Reduce negative anxiety and feel more relaxed in the classroom.

3. Pay attention to the student's efforts and activities and examine his growth process in the class.

4. Increase student and parent involvement.

5. Provide more support for the student and pay to the student's rights in the classroom.

6. Create an empathetic atmosphere among students.

7. Development of creative thinking in students.

Using this evaluation method is associated with stress reduction and makes the student interested in learning. However, if we want to pay attention to the disadvantages of this method, we can mention the following.

1. Limitation of students and parents to descriptive evaluation.

2. The anxiety of the grade when the student faces it in the following years.

3. Reducing of the sense of competition.

It is clear that the descriptive evaluation method has more advantages than its disadvantages, but it has some major problems compared with the traditional teaching method. Although we know that the traditional teaching method is mainly based on learning the material to get a good grade and the student often memorizes the material without paying attention to the relationship between them and without thinking that this subject will not be useful for doing creative work, but the student considers the grade result as the result of his effort or lack of effort, while in the descriptive method, the student sees the result of his descriptive evaluation more as the teacher's perception of him than the result of his own action. Therefore, he may not have an appropriate and logical response to his descriptive value from the teacher's point of view.

Another problem that exists in the descriptive method is that this method tried to change the structure of the evaluation system in a more flexible way, so that children are allowed to make their own decisions and have work independence, of course, under the supervision and guidance of the teacher, but this Over time, these two characteristics of flexibility and work independence will show their negative impact at the community level.

However, descriptive evaluation takes place in primary school and is considered as an educational evaluation method. The method of this evaluation is that the teacher can do it in five steps. These five steps include setting goals and expectations, collecting information, analyzing and interpreting the data obtained, making decisions and presenting a qualitative report. However, this article tries to take into account the qualitative and descriptive grades of the students, first to convert the descriptive grades into a quantitative form and to evaluate the performance of the students and then to determine their rank and position.

The main focus of this research is on the ranking of students in the primary level of one of the schools in Babol. We know that the evaluation of students' performance in primary school is qualitative. Therefore, this article intends to change the evaluation of grades from a qualitative mode to a quantitative mode using the fuzzy theory, and then to rank the students using the TOPSIS technique.

2. Background

A decision problem is a process of finding the best option among all of the given alternatives. Often, in such problems, each alternative has several multiple criteria. The decision maker (DM) wants to choose the best alternative according to all the criteria. Therefore, such problems are called Multiple Criteria Decision Making (MCDM) problems [1]. The general form of an MCDM problem is as follows:

$$D = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \end{array}$$

$$W = [\, w_1 \quad w_2 \quad \cdots \quad w_n \,]$$

where $A_1, A_2, ..., A_m$ are alternatives, $C_1, C_2, ..., C_n$ criteria, x_{ij} is the rating of alternative A_i with respect to criterion C_j and w_j is the weight of criterion C_j that is provided by DM.

The TOPSIS (technique for order preference by similarity to an ideal solution) approach was introduced by Hwang and Yoon, [2] and is one of the well-known methods for solving MCDM problems. For this purpose, two reference alternatives called positive ideal (best alternative) and negative ideal (worst alternative) are considered. The reference alternative must not be one of the m available alternatives. The first priority is given to the alternative that has the smallest distance from the positive ideal and the largest distance from the negative ideal. Usually, this task is difficult to recognize due to the presence of two distance factors, so relative distance is used. The prioritization algorithm of TOPSIS is as follows:

Step 1: Normalize the decision matrix $D=(x_{ij})_{m\times n}$ using the equation below:

$$y_{ij}=\frac{x_{ij}}{\sqrt{\sum_{k=1}^{m}x_{kj}^{2}}},\quad i=1,\dots,m;\ j=1,\dots,n.$$

Step 2: Calculate the weighted normalized decision matrix $V=(v_{ij})_{m\times n}$, as follows:

$$v_{ij}=w_j y_{ij},\quad i=1,\dots,m;\ j=1,\dots,n,$$

where w_j is the relative weight of the j th criterion or attribute, and $\sum_{j=1}^{n}w_j=1$.

Step 3: Determine the positive ideal A^+ and negative ideal A^- solution.

$$A^+=(\alpha_1^+,\dots,\alpha_n^+)=\left\{(\max_i v_{ij}\mid j\in I),(\min_i v_{ij}\mid j\in J)\right\},$$
$$A^-=(\alpha_1^-,\dots,\alpha_n^-)=\left\{(\min_i v_{ij}\mid j\in I),(\max_i v_{ij}\mid j\in J)\right\},$$

where I is associated with benefit attribute, and J is associated with cost attribute.

Step 4: Calculate the Euclidean distances d^+ and d^-, between each alternative A from the positive ideal A^+ and the negative ideal A^-, respectively as follows:

$$d_i^+=\sqrt{\sum_{j=1}^{n}(v_{ij}-\alpha_j^+)^2},\qquad i=1,\dots,m,$$

$$d_i^-=\sqrt{\sum_{j=1}^{n}(v_{ij}-\alpha_j^-)^2},\qquad i=1,\dots,m.$$

Step 5: Each alternative is related by two attributes. Then calculate relative closeness of the alternative A with respect to A^+ is defined as $R_i=\frac{d_i^-}{d_i^-+d_i^+},\ i=1,\dots,m$. Clearly, $R_i\in[0,1]$.

Step 6: Rank the alternatives according to the relative closeness to the ideal solution. The bigger the R_i, the better the alternative A_i. The best alternative is the one with the greatest relative closeness to the ideal solution.

Fuzzy theory was first introduced by Zadeh for data that has uncertainty, so it has been used in many practical problems. [3,4].

Some definitions [5]:

***Definition*1**. A fuzzy set $\tilde{A}$ in a universe of discourse X is characterized by a membership function $\mu_{\tilde{A}}(x)$ which associates with each element $x\in X$ a real number in the interval [0, 1].

***Definition* 2**. A fuzzy set $\tilde{A}$ of the universe of discourse X is convex if and only if for all x_1,x_2 in X, $\mu_{\tilde{A}}(\lambda x_1+(1-\lambda)x_2)\geq\min(\mu_{\tilde{A}}(x_1),\mu_{\tilde{A}}(x_2))$ where $\lambda\in[0,1]$.

***Definition* 3**. A fuzzy set $\tilde{A}$ of the universe of discourse X is called a normal fuzzy set implying that $\exists x_i\in X$, $\mu_{\tilde{A}}(x_i)=1$.

***Definition* 4**. A fuzzy number is a fuzzy subset in the universe of discourse X that is both convex and normal.

***Definition* 5**. For a fuzzy number $\tilde{a}$, we show the membership function by $\mu_{\tilde{a}}(x)$ which is given by

$$\mu_{\tilde{a}}(x)=\begin{cases}0, & x\leq a_1,\\ l_{\tilde{a}}(x), & a_1\leq x\leq a_2,\\ 1 & a_2\leq x\leq a_3,\\ r_{\tilde{a}}(x), & a_3\leq x\leq a_4,\\ 0, & x\geq a_4.\end{cases}$$

Where $a_1,a_2,a_3,a_4\in R$ and $l_{\tilde{a}}(x)$ is non-decreasing and $r_{\tilde{a}}(x)$ is non-increasing and

$l_{\tilde{a}}(a_1)=0,\ l_{\tilde{a}}(a_2)=1,\ r_{\tilde{a}}(a_3)=1$ and $r_{\tilde{a}}(a_4)=0$. The trapezoidal fuzzy numbers are special cases of fuzzy numbers is as follows (Fig. 1):

$$l_{\tilde{a}}(x)=\frac{x-a_1}{a_2-a_1},\ r_{\tilde{a}}(x)=\frac{a_4-x}{a_4-a_3}.$$

Also, triangular fuzzy numbers are also special cases of trapezoidal fuzzy numbers with $a_2=a_3$. Therefore, a triangular fuzzy number $\tilde{a}$ can be represented as an ordered triple (a_1, a_2, a_3) as shown in Fig. 2.

***Definition* 6**. Suppose that $\tilde{a}=(a_1,a_2,a_3)$ and $\tilde{b}=(b_1,b_2,b_3)$ be two triangular fuzzy numbers, then the distance between them is defined as follows:

$$d(\tilde{a},\tilde{b})=\sqrt{\frac{1}{3}[(a_1-b_1)^2+(a_2-b_2)^2+(a_3-b_3)^2]}.$$

Note: Some fundamental operations on positive fuzzy numbers

Assume that $\tilde{a}=(a_1,a_2,a_3)$, $\tilde{b}=(b_1,b_2,b_3)$ be two positive fuzzy numbers and $k\in R^+$, then:

1. $\tilde{a}+\tilde{b}=(a_1+b_1,a_2+b_2,a_3+b_3)$.
2. $\tilde{a}-\tilde{b}=(a_1-b_3,a_2-b_2,a_3-b_1)$.
3. $k\tilde{a}=(ka_1,ka_2,ka_3)$.
4. $\tilde{a}^{-1}=(\frac{1}{a_3},\frac{1}{a_2},\frac{1}{a_1})$.
5. $\tilde{a}\times\tilde{b}=(a_1b_1,a_2b_2,a_3b_3)$.
6. $\frac{\tilde{a}}{\tilde{b}}=(\frac{a_1}{b_3},\frac{a_2}{b_2},\frac{a_3}{b_1})$.

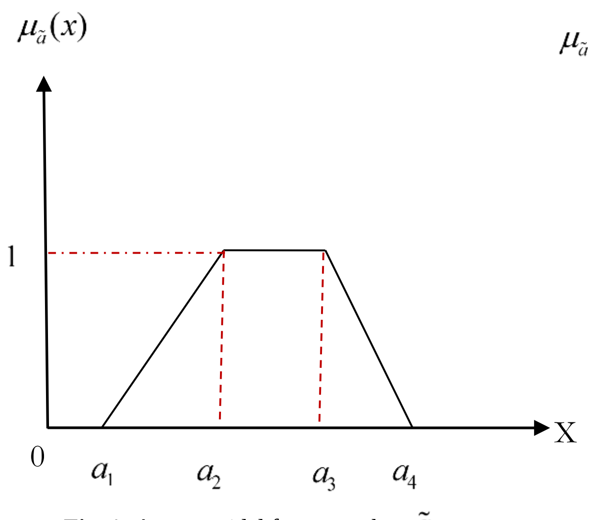

Fig. 1. A trapezoidal fuzzy number $\tilde{a}$

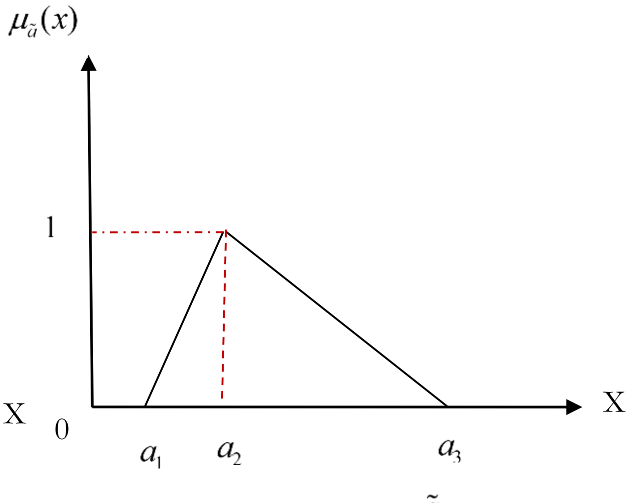

Fig. 2. A triangular fuzzy number $\tilde{a}$.

3. Fuzzy TOPSIS method

In fuzzy MCDM problems, criteria values and relative weights are usually characterized by fuzzy numbers. Suppose triangular fuzzy numbers are denoted as (a,b,c) and a fuzzy MCDM problem is defined as follows [6-8]:

$$D = \begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \cdots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \cdots & \tilde{x}_{2n} \\ \vdots & \vdots & & \vdots \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \cdots & \tilde{x}_{mn} \end{bmatrix} \end{array}$$

$$W = [\,\tilde{w}_1 \quad \tilde{w}_2 \quad \cdots \quad \tilde{w}_n\,]$$

$\tilde{x}_{ij} = (a_{ij}, b_{ij}, c_{ij})$, $i = 1,...,m; j = 1,...,n$ and $\tilde{w}_j = (w_{j1}, w_{j2}, w_{j3})$, $j = 1,...,n$ is the weight of criterion C_j that is provided by DM. The normalized fuzzy decision matrix $\tilde{R} = (r_{ij})_{m\times n}$ is formed according to the profit criteria and the cost criteria as follows:

$$\tilde{r}_{ij} = (\frac{a_{ij}}{c_j^+}, \frac{b_{ij}}{c_j^+}, \frac{c_{ij}}{c_j^+}), \quad j \in profit,$$

$$\tilde{r}_{ij} = (\frac{\frac{1}{c_{ij}}}{a_j^-}, \frac{\frac{1}{b_{ij}}}{a_j^-}, \frac{\frac{1}{a_{ij}}}{a_j^-}), \quad j \in \cos t,$$

where $c_j^+ = \max c_{ij}$, $1 \le i \le m,$ and $a_j^- = \min a_{ij}$, $1 \le i \le m.$

Now that DM has taken into account the importance of the criteria, then we can construct a fuzzy normalized decision matrix as follows:

$$\tilde{V} = (\tilde{v}_{ij})_{m\times n}, \qquad i = 1,...,m; \ j = 1,...,n,$$

where $\tilde{v}_{ij} = \tilde{r}_{ij}.\tilde{w}_j$.

Since the matrix elements are normalized, we know that these numbers belong to the interval [0,1]. Therefore, we can define positive ideal and negative ideal alternatives as follows:

$A^+ = (\tilde{v}_1^+, \tilde{v}_2^+, ..., \tilde{v}_n^+)$, $A^- = (\tilde{v}_1^-, \tilde{v}_2^-, ..., \tilde{v}_n^-)$ where $\tilde{v}_j^+ = (1,1,1),$ and $\tilde{v}_j^- = (0,0,0),$ $j = 1,...,n$.

The distance between each alternative with fuzzy positive ideal point and fuzzy negative ideal point can be calculated as follows:

$$d_i^+ = \sum_{j=1}^{n} d\left(\tilde{v}_{ij}, \tilde{v}_j^+\right), \quad i = 1,...,m,$$

$$d_i^- = \sum_{j=1}^{n} d\left(\tilde{v}_{ij}, \tilde{v}_j^-\right), \quad i = 1,...,m,$$

where $d(.,.)$ is the measured distance between two fuzzy numbers. Now, we can determine the ranking of all alternatives using the concept of the coefficient of proximity of each alternative to the positive ideal and negative ideal points. This proximity coefficient (PC) is calculated as follows:

$$PC_i = \frac{d_i^-}{d_i^+ + d_i^-}, \quad i = 1,...,m.$$

It is clear that if an alternative is closer to the positive ideal point and further away from the negative ideal point, then its rating index value is close to 1. Thus, we can rank all alternatives according to the proximity coefficient.

4. Case study

In this section, a research example using the fuzzy TOPSIS technique is presented. This research consists of 30 elementary school students in one of the schools in Babol, whose performance evaluation and ranking are based on eight descriptive criteria. These criteria include average score, discipline, timely attendance, assignments, responsibility, concentration, academic achievement and legality.

The steps of the fuzzy TOPSIS method are presented below:

Step 1: Use linguistic weight variables to determine the importance of criteria.

Step 2: Apply linguistic rating variables to evaluate the score of each alternative relative to each criterion.

Step 3: Convert the linguistic evaluation to triangular fuzzy numbers and forma a fuzzy decision matrix.

Step 4: Convert the fuzzy decision matrix to normalized fuzzy decision matrix.

Step 5: Construct the weighted normalized fuzzy decision matrix.

Step 6: Determine fuzzy positive ideal point and fuzzy negative ideal point.

Step 7: Determine the distance of each alternative from the fuzzy positive ideal and fuzzy negative ideal.

Step 8: Determine the proximity coefficient for each alternative and its ranking.

The relative importance weights of the eight descriptive criteria are represented by linguistic variables in Table 1, and the value of the eight criteria is defined by a set of linguistic variables and represented as triangular fuzzy numbers in Table 2.

Table 1. Linguistic variables for the importance weight of each criterion

Code	Linguistic variables	Triangular fuzzy numbers		
		Lower Bound	Peak Value	Upper Bound
1	Very Low (VL)	0	0	0.1
2	Low (L)	0	0.1	0.3
3	Medium Low (ML)	0.1	0.3	0.5
4	Medium (M)	0.3	0.5	0.7
5	Medium High (MH)	0.5	0.7	0.9
6	High (H)	0.7	0.9	1.0
7	Very High (VH)	0.9	1.0	1.0

Table 2. Linguistic variables for the ratings

Code	Linguistic variables	Triangular fuzzy numbers		
		Lower Bound	Peak Value	Upper Bound
1	Very Poor (VP)	0	0	1
2	Poor (P)	0	1	3
3	Medium Poor (MP)	1	3	5
4	Fair (F)	3	5	7
5	Medium Good (MG)	5	7	9
6	Good (G)	7	9	10
7	Very Good (VG)	9	10	10

Table 3. The importance weight of the criteria by teacher and manager

Code	Descriptive Criteria	Teacher	Manager	Aggregated fuzzy number
1	legality	H	H	(0.7,0.9,1.0)
2	academic progress	VH	VH	(0.9,1.0,1.0)
3	concentration in class	VH	H	(0.8,0.95,1.0)
4	responsibility	H	VH	(0.8,0.95,1.0)
5	doing homework	VH	MH	(0.7,0.85,0.95)
6	attending class on time	H	MH	(0.6, 0.8,0.95)
7	Discipline	VH	H	(0.8,0.95,1.0)
8	score average	VH	VH	(0.9,1.0,1.0)

Table 4. Fuzzy weights and fuzzy decision matrix for 91 students with linguistic variables

Code	average score	discipline	timely attendance	assignments	responsibility	concentration	academic achievemen t	legality
	(0.9,1,1)	(0.8,0.95,1)	(0.6, 0.8,0.95)	(0.7,0.85,0.95)	(0.8,0.95,1)	(0.8,0.95,1)	(0.9,1,1)	(0.7,0.9,1)
1	G	G	VG	G	G	F	F	G
2	VG	G	VG	VG	VG	G	G	G
3	VG	VG	VG	G	G	G	VG	G
4	VG	VG	VG	VG	VG	VG	G	G
5	VG	VG	VG	G	VG	F	F	G
6	F	G	VG	G	F	F	F	F
7	G	VG	VG	VG	VG	VG	G	G
8	VG	VG	VG	VG	VG	VG	VG	VG
9	VG	VG	VG	VG	G	VG	VG	VG
10	VG	VG	VG	VG	VG	VG	VG	VG
11	G	P	P	P	F	G	P	P
12	P	F	VG	F	P	P	P	P
13	G	G	VG	F	P	P	F	P
14	VG	VG	VG	VG	VG	VG	VG	VG
15	VG	VG	VG	VG	VG	VG	VG	G
16	P	G	VG	G	G	G	G	G
17	VG	VG	VG	VG	VG	VG	VG	VG
18	VG	VG	VG	VG	G	VG	VG	VG
19	VG	G	VG	G	G	G	G	F
20	VG	VG	VG	VG	VG	VG	VG	VG
21	VG	VG	VG	VG	VG	VG	VG	VG
22	F	G	VG	G	G	P	F	P
23	G	F	VG	G	VP	G	F	P
24	VG	F	VG	F	F	P	G	P
25	VG	VG	VG	G	F	G	VG	F
26	VG	VG	VG	VG	VG	VG	G	VG
27	VG	VG	VG	VG	VG	VG	VG	VG
28	VG	VG	VG	VG	VG	VG	VG	VG
29	VG	VG	VG	VG	VG	VG	VG	VG
30	G	VG	VG	VG	VG	VG	G	VG

Table 3 shows the comments of the teacher and the manager for the relative importance of the weights compared to eight criteria independently, where aggregated fuzzy numbers are obtained by averaging the fuzzy opinions of the teacher and the manager. Table 4 shows the fuzzy weights and fuzzy decision matrix for 30 students according to the teacher's opinion only. Also, Table 5 shows the fuzzy normalized decision matrix for 30 students and its positive ideal and negative ideal solutions.

Table 5. Fuzzy normalized decision matrix for 30 students and its positive ideal and negative ideal solutions

Code	score average	discipline	attending class on time	doing homework	responsibility	concentration in class	academic progress	legality
S1	(0.63,0.9,1)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.56,0.86,1)	(0.24,0.48,0.7)	(0.27,0.5,0.7)	(0.49,0.81,1)
S2	(0.81,1,1)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.56,0.86,1)	(0.63,0.9,1)	(0.49,0.81,1)
S3	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.56,0.86,1)	(0.56,0.86,1)	(0.81,1,1)	(0.49,0.81,1)
S4	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.63,0.9,1)	(0.49,0.81,1)
S5	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.72,0.95,1)	(0.24,0.48,0.7)	(0.27,0.5,0.7)	(0.49,0.81,1)
S6	(0.27,0.5,0.7)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.24,0.48,0.7)	(0.24,0.48,0.7)	(0.27,0.5,0.7)	(0.21,0.45,0.7)
S7	(0.63,0.9,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.63,0.9,1)	(0.49,0.81,1)
S8	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S9	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.56,0.86,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S10	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S11	(0.63,0.9,1)	(0,0.1,0.3)	(0,0.08,0.29)	(0,0.09,0.29)	(0.24,0.48,0.7)	(0.56,0.86,1)	(0,0.1,0.3)	(0,0.09,0.3)
S12	(0,0.1,0.3)	(0.24, 0.48,0.7)	(0.54,0.8,0.95)	(0.21,0.43,0.67)	(0,0.1,0.3)	(0,0.1,0.3)	(0,0.1,0.3)	(0,0.09,0.3)
S13	(0.63,0.9,1)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.21,0.43,0.67)	(0,0.1,0.3)	(0,0.1,0.3)	(0.27,0.5,0.7)	(0,0.09,0.3)
S14	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S15	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.49,0.81,1)
S16	(0,0.1,0.3)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.56,0.86,1)	(0.56,0.86,1)	(0.63,0.9,1)	(0.49,0.81,1)
S17	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S18	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.56,0.86,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S19	(0.81,1,1)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.56,0.86,1)	(0.56,0.86,1)	(0.63,0.9,1)	(0.21,0.45,0.7)
S20	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S21	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S22	(0.27,0.5,0.7)	(0.56,0.86,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.56,0.86,1)	(0,0.1,0.3)	(0.27,0.5,0.7)	(0,0.09,0.3)
S23	(0.63,0.9,1)	(0.24, 0.48,0.7)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0,0,0.1)	(0.56,0.86,1)	(0.27,0.5,0.7)	(0,0.09,0.3)
S24	(0.81,1,1)	(0.24, 0.48,0.7)	(0.54,0.8,0.95)	(0.21,0.43,0.67)	(0.24,0.48,0.7)	(0,0.1,0.3)	(0.63,0.9,1)	(0,0.09,0.3)
S25	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.49,0.77,0.95)	(0.24,0.48,0.7)	(0.56,0.86,1)	(0.81,1,1)	(0.21,0.45,0.7)
S26	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.63,0.9,1)	(0.63,0.9,1)
S27	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S28	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S29	(0.81,1,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.81,1,1)	(0.63,0.9,1)
S30	(0.63,0.9,1)	(0.72,0.85,1)	(0.54,0.8,0.95)	(0.63,0.85,0.95)	(0.72,0.95,1)	(0.72,0.95,1)	(0.63,0.9,1)	(0.63,0.9,1)
S^+	1,1,1)(	1,1,1)(	1,1,1)(	1,1,1)(	1,1,1)(	1,1,1)(	1,1,1)(	1,1,1)(
S^-	0,0,0)(	0,0,0)(	0,0,0)(	0,0,0)(	0,0,0)(	0,0,0)(	0,0,0)(	0,0,0)(

Table 6 shows the proximity coefficient and ranking of 30 elementary students in Babol. The results of Table 6 show that 9 students are ranked first. This was expected according to Table 4 because they all had full privileges according to the descriptive criteria. One can rank these 9 students based on other criteria, or the teacher's judgment is based on more criteria. The student in row 15 of Table 4 was ranked second because he/she scored very high on all criteria except legality. The results also show that the student in row 12 had the last rank because he/she was very good at entering the classroom and was poor or fair in other criteria.

Table 6. Proximity coefficients and ranking

Code	d_i^-	d_i^+	pc_i	Rank
S1	5.89	2.78	0.6794	13
S2	6.76	1.86	0.7842	8
S3	6.74	1.86	0.7837	9
S4	6.86	1.66	0.8052	5
S5	6.07	2.47	0.7108	12
S6	4.93	3.66	0.5739	18
S7	6.78	1.77	0.7230	7
S8	7.00	1.46	0.8274	1
S9	6.93	1.57	0.8153	3
S10	7.00	1.46	0.8274	1
S11	3.09	5.43	0.3627	20
S12	2.67	5.82	0.3145	21
S13	4.01	4.53	0.4696	19
S14	7.00	1.46	0.8274	1
S15	6.94	1.55	0.8174	2
S16	5.87	2.83	0.6747	14
S17	7.00	1.46	0.8274	1
S18	6.93	1.57	0.8153	3
S19	6.38	2.33	0.7325	10
S20	7.00	1.46	0.8274	1
S21	7.00	1.46	0.8274	1
S22	5.22	3.42	0.6042	15
S23	5.12	3.48	0.5953	16
S24	5.06	3.53	0.5891	17
S25	6.12	2.42	0.7166	11
S26	6.92	1.57	0.8151	4
S27	7.00	1.46	0.8274	1
S28	7.00	1.46	0.8274	1
S29	7.00	1.46	0.8274	1
S30	6.84	1.68	0.8028	6

5. **Conclusions**

Considering the fact that the evaluation of students is descriptive in the elementary basis, this evaluation usually does not get an accurate score of their performance due to the lack of a benchmark as an effective output and therefore cannot determine the true position of students. Of course, methods of evaluating students' descriptive performance have been given, which are often surveys and judicial forms, although the judgment of managers is sometimes necessary. The current study was conducted on 30 elementary students in one of the schools of Babol using a combination of fuzzy concept and TOPSIS technique, which evaluated the performance and ranking of students. As a result of this research, it was observed that 9 students were ranked first, which is the result of a descriptive evaluation that classified most students in specific categories such as poor, fair, good, and the like.

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