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Ranking Islamic Religious Schools Academic Performance by Using Fuzzy Vikor

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Abstract: *Ranking is a position in hierarchy or scale. Schools ranking in Malaysia has become a popular benchmark for academic achievement as in Malaysia, there are many types of schools. This study focuses only on Islamic religious schools. The objective of this study is to rank Islamic religious schools in Perlis based on their academic achievement in Sijil Pelajaran Malaysia (SPM) 2018. This study used Fuzzy VIKOR to assess the ranking of Islamic religious schools in Perlis. Fuzzy VIKOR is one of the multi-criteria decision-making (MCDM) methods. The Islamic religious schools is the alternative to be chosen and the results for a number of subjects is the criterion. In this study, the data is transformed into a linguistic variable and categorised into five criteria which are excellent, honours, average, pass and fail. The linguistic variable is represented by a trapezoidal fuzzy number. The results of this study showed that Fuzzy VIKOR can be used in sorting the rank of Islamic religious schools. By using this technique, the results show that school 1 is the best Islamic religious school in Perlis. This has proven that Fuzzy VIKOR can be applied in sorting the rank.*

Keywords: Multi Criteria Decision Making (MCDM), VIKOR, fuzzy number, Islamic religious schools, *Sijil Pelajaran Malaysia* (SPM)

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1. Introduction

The ranking of schools in Malaysia has become a popular benchmark for academic achievement. The academic system in Malaysia has evolved from the fragmentary system inherited from the British colonial administrators. Islamic education in Malaysia has grown over the years and is believed to have existed before the Independence. In Islamic religious schools, students will learn about Islam, Islam-related subjects and high level of Arabic Language. Islamic religious schools can be divided into two categories,; 1) government and 2) private Islamic religious schools such as *Maahad Tahfiz*. Government-owned Islamic religious schools are known as national religious secondary schools and government-assisted religious schools. Islamic religious schools also need to cope with the content of the syllabus as part of the education system. Islamic religious schools are designed to produce students who practise good manners and who are self-sufficient in the face of cultural challenges that conflict with Islamic values, and to achieve excellence in curricular and co-curricular aspects. As Berita Harian (2016) reported, the Government of Malaysia is currently developing the *Dasar Pendidikan Tahfiz Negara* (DPTN) to empower educational institutions. In April 2018, it is stated that there are 273 Islamic religious schools and 168 *Maahad Tahfiz* (Harian Metro, 2017). The advantages of choosing Islamic religious schools are that they try to practise the culture of Islamic life, increase the potential to be an expert who understands Islam and create more opportunities for further education such as mastering Arabic Language and Quranic skills. The aim of this study is, therefore, to identify the best Islamic religious schools by using Fuzzy VIKOR, which can set a new benchmark for Malaysia's education system. The ranking of Islamic religious schools is essential to determine the best school, thus having an impact on the religious education system. The evaluation of the classification of Islamic religious schools on the basis of their academic performance is therefore necessary in order to determine the performance of the schools. This assessment is important to influence public perception of the religious institutions. This study used Fuzzy VIKOR to assess the ranking of Islamic religious schools in Perlis. This study used a sample data of SPM results from 2018 from five selected Islamic religious schools in Perlis. The objective of this study is to evaluate and rank the Islamic religious schools containing multiple conflicting criteria.

2. Literature Review

Fuzzy VIKOR

Fuzzy is defined as difficult to perceive, indistinct or vague. Multi-criteria decision-making (MCDM) deals with decisions involving the selection of the best alternative or solution from a number of potential decision-making options. Fuzzy Vise Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR) is one of the methods used to solve MCDM problems. The use of Fuzzy VIKOR method is based on the fact that the method can choose a highly effective and efficient decision-making option with multiple attributes and multiple-criteria (Siregar et al., 2018).

A systematic approach of Fuzzy VIKOR method for multi-criteria fuzziness is a comparison of the degree of proximity to the ideal option. The application of Fuzzy VIKOR method begins with the development of the corresponding evaluation or decision matrix. Subjective assessment shall be carried out in the development of the decision matrix. Alternatives will be decided on the basis of the criteria selected. As the multi-criteria is expressed in the matrix, a fuzzy decision matrix is constructed and the linguistic variable will be converted into a fuzzy number. A linguistic variable is a value defined as a non-numeric set. Linguistic variables are usually found in triangular and trapezoidal fuzzy numbers (Liu, Liu, Liu, & Mao, 2012).

Applications of Fuzzy VIKOR

There are many applications in using Fuzzy VIKOR. For example, ranking the best instructional video. By ranking the best video, many will get the benefits especially educators. Accordingly, the findings in the study by Acuña-Soto, Liern, and Pérez-Gladish (2019), have shown that VIKOR method allows the ranking of videos on the basis of their similarity to the ideal solution to be used in the first phase of decision-making with normalisation purposes.

In addition, VIKOR was also used in the group decision-making process for selecting car parts from suppliers in Iran (Sanayei, Farid Mousavi, & Yazdankhah, 2010). The determination of the supplier in the supply chain is important as the competence of different organisations, place to establish higher quality, longer-lasting relationship between the company and the supplier. VIKOR method can also be used to evaluate the process.

Chang (2014) used VIKOR method to evaluate hospital services. The results of the analysis show the best quality of hospital service. This study was designed to consolidate the quality of service performance ratings of feasible alternatives. This study shows that patients prefer a private hospital to a government hospital based on the evaluation criteria.

Several applications are carried out using different methods and Fuzzy VIKOR can also be applied in other studies. The method of Fuzzy VIKOR is suitable for solving MCDM problems such as ranking. Not many studies to rank schools or academic institutions using Fuzzy VIKOR have been carried out. Therefore, since Fuzzy VIKOR can be used in solving MCDM problems, it is suitable to use in order to determine the rank of religious schools.

3. Methodology

The steps of Fuzzy VIKOR are as follows:

Step 1: Transform data into linguistic variable for each level of achievement.

In carrying out the analysis, first, the data must be transformed into a linguistic variable. The linguistic variable is defined as variables which are not values, but words or phrases in a natural or artificial language in which the level of uncertainty cannot be determined. The linguistic variable used in this study is adapted from previous studies in school ranking performance (Musani & Jemain, 2015). The students' achievement is categorized into five criteria which are excellent, honours, average, pass and fail. This grade is represented by a trapezoidal fuzzy number. Results will be ranked in Table 1.

Table 1: Linguistic variable for each level of achievement

Linguistic Variable	Trapezoidal Fuzzy Number (TzFN)
Excellent	(8,9,10,10)
Honours	(6,7,8,9)
Average	(3,4,5,7)
Pass	(1,2,3,4)
Fail	(0,0,0,2)

Linguistic variable of the TzFN can be illustrated as:

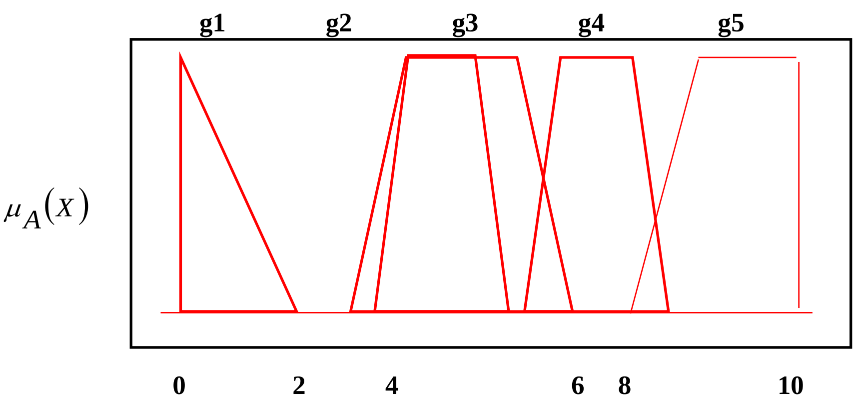

Figure 1: Trapezoidal Fuzzy Number Membership Function
(Source: Musani & Jemain, 2015)

Step 2: Express MCDM problem into Matrix Format.

Based on the linguistic variable, the data collected as a percentage will be calculated in a matrix format and calculated according to the step in the data development process. There are m alternatives that can be shown as $A_i\,(i=1,2,\ldots,m)$ to which will be evaluated based on the criteria selected which is $C_j\,(j=1,2,\ldots,n)$. Each criteria has five grades of achievement

$g = 1,2,\ldots,5$ to be calculated. The subjective analysis is to calculate the decision matrix $X = \{x_{ijg}, i = 1,2,\ldots,m; j = 1,2,\ldots,n; g = 1,2,\ldots,5\}$ using the linguistic variable. Decision matrix form can be expressed as follows

$$X = \begin{matrix} & C_1 & C_2 & \cdots & C_n \\ A_1 & x_{11} & x_{12} & \cdots & x_{1n} \\ A_2 & x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ A_M & x_{m1} & x_{m2} & \cdots & x_{mn} \end{matrix}, \quad (1)$$

where $A_1, A_2, \ldots, A_m$ are Islamic religious schools to be selected, the evaluation criteria are $C_1, C_2, \ldots, C_n$, and x_{ijg} is the rating of alternative A_i with respect to C_J, w_j is the importance weight of the *j*th criterion holds.

Step 3: Construct Fuzzy Decision Matrix.
After the decision making of a multi-criteria matrix has been expressed, construct a fuzzy decision matrix. The cumulative fuzzy rating of alternatives for the trapezoidal fuzzy number is a modification of the arithmetic weighted average method. The equation can be formed by the use of:

$$\tilde{X} = \sum_{i=1}^{m}\sum_{j=1}^{n}\sum_{g=1}^{5} x_{ijg} \otimes TzFN = \left[\tilde{X}_{ij}\right]_{m\times n} = \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \cdots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \cdots & \tilde{x}_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \tilde{x}_{m1} & \tilde{x}_{m2} & \cdots & \tilde{x}_{mn} \end{bmatrix} \quad (2)$$

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

Due to simple and flexible operations, this method is the most frequently used aggregation process and fits well with the study. $\tilde{x}_{ij}$ and $\tilde{w}_j$ are linguistic variables denoted by the trapezoidal range. The place is the rating of the alternative A_i with admire to C_j , $\tilde{w}_j$ being the jth criterion of the importance weight. A trapezoidal fuzzy variety may be defined as $\tilde{x}_{ij} = (\tilde{a}_{ij}, \tilde{b}_{ij}, \tilde{c}_{ij}, \tilde{d}_{ij})$.

Step 4: Evaluate the fuzzy importance weight of criteria.
The fuzzy weighted values for each criterion will be determined on the basis of their relevance. The degree of importance of each criterion is directly proportional to the concerns of each school. Relative value was also said to be directly proportional to the number of candidates sitting for specific subjects. This showed that the higher the weight value, the higher the priority should be given to criteria with a higher number of candidates. This is because it brings with it an extra concern to ensure that each candidate can understand and deal very well with the subject. Therefore, if there is a number of candidates who take subject j, then the fuzzy importance of subjects is given as

$$\tilde{w}_j = \tilde{s}_j / \sum_{j=1}^{n} \tilde{s}_j \quad (3)$$

is the standard deviation value for the criterion. The standard deviation is calculated as follows:

$$\tilde{s}_j = \sqrt{\frac{1}{M}\sum_{m=1}^{M}\left(\tilde{x}_{mn} - \bar{\tilde{x}}_n\right)^2} \quad (4)$$

Step 5: Determine the fuzzy best value and worst value.
Determination of fuzzy best value $\tilde{x}_j^*$ and fuzzy worst value $\tilde{x}_j^-$ can be calculated as,:

$$\tilde{x}_j^* = \max \tilde{x}_{ij} \quad (5)$$

$$\tilde{x}_j^- = \min \tilde{x}_{ij} \quad (6)$$

Step 6: Compute the normalized fuzzy decision matrix.
After evaluating the fuzzy importance weight of criteria, and determining the fuzzy best value and worst value, a normalised fuzzy decision matrix is calculated. The standardisation process is designed to ensure that the criterion value of the fuzzy decision matrix is within the range of 0 and 1. In short, all criteria are standard and comparable to each other. The VIKOR method uses the linear normalisation method to stabilise the result. Linear normalisation formula indicated by the score are as follows:

$$\tilde{S}_i = \sum_{j=1}^{n}\tilde{w}_j\left(\frac{\tilde{x}_j^* - \tilde{x}_{ij}}{\tilde{x}_j^* - \tilde{x}_j^-}\right) \text{ and} \quad (7)$$

$$\tilde{R}_i = Max\left[\tilde{w}_j\left(\frac{\tilde{x}_j^* - \tilde{x}_{ij}}{\tilde{x}_j^* - \tilde{x}_j^-}\right)\right] \quad (8)$$

Step 7: Compute the index Fuzzy VIKOR value.
The next step in determining the rank is to calculate the index VIKOR

$$\tilde{Q}_i = v\left(\frac{\tilde{S}_i - \tilde{S}^-}{\tilde{S}^+ - \tilde{S}^-}\right) + (1-v)\left(\frac{\tilde{R}_i - \tilde{R}^-}{\tilde{R}^+ - \tilde{R}^-}\right) \quad (9)$$

where,

$$\tilde{S}^+ = \max_i \tilde{S}_i, \tilde{S}^- = \min_i \tilde{S}_i$$

$$R^+ = \max_i \tilde{R}_i, \tilde{R}^- = \min_i \tilde{R}_i$$

v is introduced as the weight of the maximum group utility of strategy. V is the weight regret of the individual. Thus, if v is larger $(v > 0.5)$, the index $\tilde{Q}_i$ will tend to be a majority rule (Ju & Wang, 2013). Based on the study, commonly, the weight in the strategy of the maximum group utility is taken as $v = 0.5$ (Wu, Chen, Chen, & Zhuo, 2012).

Step 8: Sort the values in descending order.
After calculating the value $\tilde{S}, \tilde{R}$ and $\tilde{Q}$, the order will be sorted into decreasing order. The best alternative in order $\tilde{Q}$ is the maximum possible value that has been achieved on the basis $\tilde{Q}$ of merit points. Alternatives that are in the best position with the maximum value $\tilde{Q}$ will be recommended as the best alternatives for providing a compromise solution if and only if they can be proven by satisfying the two conditions. The conditions to be satisfied are acceptable advantage and acceptable stability in decision-making. The alternative is accepted as the best advantage when the VIKOR $\tilde{Q}$ difference between alternative two and alternative one must be higher than or equal to the DQ value. In order to meet the second condition,

Alternative 1 must also be in the best ranking $\tilde{S}$ or $\tilde{R}$. Thus, if the alternative with the maximum value $\tilde{Q}$ satisfies both conditions, the alternative is to conclude as the best alternative or option to choose.

Result and Discussion

The selected Islamic religious schools [School 1 (S1), School 2 (S2), School 3 (S3), School 4 (S4) and School 5 (S5)] are to be evaluated by five major subjects taught at the school which are *Bahasa Melayu* (BM), English Language (E), Mathematics (M), Science (S) and *Bahasa Arab* (BA) in five grades for each subject which are excellent (g5), honours (g4), average (g3), pass (g2) and fail (g1) as shown in Table 2 below:

Table 2a: Data on the percentage of academic achievement

	BM					E				
	g1	**g2**	**g3**	**g4**	**g5**	**g1**	**g2**	**g3**	**g4**	**g5**
S1	0.000	0.000	0.102	0.409	0.488	0.080	0.750	0.148	0.023	0.000
S2	0.000	0.010	0.141	0.667	0.182	0.000	0.626	0.192	0.111	0.071
S3	0.015	0.088	0.103	0.397	0.397	0.059	0.529	0.191	0.176	0.044
S4	0.000	0.000	0.000	0.164	0.836	0.000	0.050	0.179	0.393	0.379
S5	0.000	0.000	0.000	0.078	0.922	0.000	0.302	0.241	0.284	0.172

Table 2b: Data on the percentage of academic achievement

	M					S				
	g1	**g2**	**g3**	**g4**	**g5**	**g1**	**g2**	**g3**	**g4**	**g5**
S1	0.034	0.466	0.284	0.159	0.057	0.000	0.091	0.296	0.364	0.250
S2	0.010	0.212	0.242	0.263	0.273	0.000	0.143	0.318	0.460	0.079
S3	0.029	0.132	0.177	0.250	0.412	0.000	0.067	0.200	0.311	0.422
S4	0.000	0.029	0.079	0.179	0.714	0.000	0.000	0.014	0.230	0.757
S5	0.017	0.052	0.129	0.155	0.647	0.000	0.000	0.000	0.132	0.868

Table 2c: Data on the percentage of academic achievement

	BA				
	g1	**g2**	**g3**	**g4**	**g5**
S1	0.023	0.284	0.341	0.284	0.068
S2	0.000	0.212	0.283	0.343	0.152
S3	0.177	0.324	0.206	0.191	0.103
S4	0.000	0.050	0.264	0.336	0.350
S5	0.018	0.171	0.225	0.369	0.216

Table 2 shows the observations in decision matrix which describe the percentage of students' results of each subjects. School 1 shows that the percentage of students who obtained a fail grade for BM is 0.00 percent, percentage of pass is 0.00 percent, average grade is 10.2 percent, 40.9 and 48.8 percent respectively for honours and excellent grades.

Five grades for each subject used linguistic variable. The corresponding fuzzy numbers of five linguistic variables are shown in Table 1 and the membership functions are shown in Figure 1. Based on the equation (1) and (2), convert the linguistic variables into TzFN as well aggregate the score. The result of the aggregated trapezoidal fuzzy number decision matrix is as shown in Table 3.

Table 3a: Fuzzy decision matrix

	BM				E			
	a	b	c	d	a	b	c	d
S1	6.665	7.664	8.663	9.277	1.329	2.250	3.170	4.397
S2	5.888	6.888	7.888	8.848	2.434	3.434	4.434	5.555
S3	5.956	6.942	7.927	8.647	2.514	3.455	4.396	5.602
S4	7.671	8.671	9.671	9.836	5.971	6.971	7.971	8.771
S5	7.845	8.845	9.845	9.922	4.112	5.112	6.112	7.181

Table 3b: Fuzzy decision matrix

	M				S			
	a	b	c	d	a	b	c	d
S1	2.727	3.693	4.659	5.920	5.159	6.159	7.159	8.205
S2	4.697	5.686	6.676	7.656	4.492	5.492	6.492	7.730
S3	5.456	6.427	7.397	8.192	5.911	6.911	7.911	8.689
S4	7.050	8.050	9.050	9.414	7.473	8.473	9.473	9.730
S5	6.543	7.526	8.509	9.009	7.736	8.736	9.736	9.868

Table 3c: Fuzzy decision matrix

	BA			
	A	b	c	d
S1	3.557	4.534	5.512	6.807
S2	4.333	5.323	6.313	7.434
S3	2.911	3.734	4.557	5.837
S4	5.657	6.657	7.657	8.571
S5	4.793	5.775	6.757	7.784

Fuzzy importance weight of criteria are illustrated in Table 4. To clearly state this, fuzzy weight of Subject 1 with respect to $\tilde{a}\left(\tilde{w}_{Subject1,\tilde{a}}\right)$ is calculated as:

$$\tilde{\bar{x}} = \frac{1}{5}\sum_{m=1}^{5}\tilde{x}_{m\tilde{a}} = \frac{1}{5}(34.0256) = 6.805,$$

$$\tilde{s}_{Subject1,\tilde{a}} = \sqrt{\frac{1}{5}\sum_{m=1}^{5}\left(\tilde{x}_{m\tilde{a}} - \tilde{\bar{x}}_{\tilde{a}}\right)^2}$$

$$= \sqrt{\frac{1}{5}\left[\begin{array}{l}(6.665-6.805)^2 + (5.888-6.805)^2 + (5.956-6.805)^2 \\ + (7.671-6.805)^2 + (7.845-6.805)^2\end{array}\right]}$$

$$= 0.826$$

$$\tilde{s}_{Subject1,\tilde{b}} = 0.829, \tilde{s}_{Subject1,\tilde{c}} = 0.832, \tilde{s}_{Subject1,\tilde{d}} = 0.511$$

$$\tilde{s}_{Subject2,\tilde{a}} = 1.615, \tilde{s}_{Subject2,\tilde{b}} = 1.640, \tilde{s}_{Subject2,\tilde{c}} = 1.665, \tilde{s}_{Subject2,\tilde{d}} = 1.520$$

$$\tilde{s}_{Subject3,\tilde{a}} = 1.524, \tilde{s}_{Subject3,\tilde{b}} = 1.533, \tilde{s}_{Subject3,\tilde{c}} = 1.542, \tilde{s}_{Subject3,\tilde{d}} = 1.224$$

$$\tilde{s}_{Subject4,\tilde{a}} = 1.269, \tilde{s}_{Subject4,\tilde{b}} = 1.006, \tilde{s}_{Subject4,\tilde{c}} = 1.059, \tilde{s}_{Subject4,\tilde{d}} = 0.922$$

$$\tilde{w}_{Subject1,\tilde{a}} = \frac{0.826}{\begin{pmatrix} 0.826+0.829+0.832+0.511+1.615+1.640+1.665+1.520 \\ +1.524+1.533+1.542+1.224+1.269+1.006+1.059+0.922 \end{pmatrix}}$$

$$= \frac{0.826}{23.849} = 0.035$$

Thus, the importance weight of each criterion is as shown in Table 4 below~~.~~:

Table 4a: Fuzzy importance weight

BM				E				M			
a	**b**	**c**	**d**	**a**	**b**	**c**	**d**	**a**	**b**	**c**	**d**
0.035	0.035	0.035	0.021	0.068	0.069	0.070	0.064	0.064	0.064	0.065	0.051

Table 4b: Fuzzy importance weight

S				BA			
a	**b**	**c**	**d**	**a**	**b**	**c**	**d**
0.053	0.053	0.053	0.035	0.040	0.042	0.044	0.039

Based on Table 3, fuzzy best value $\tilde{x}_j^*$ and fuzzy worst value $\tilde{x}_j^-$ are simplified into Table 5 below~~.~~:

Table 5a: Fuzzy best value and worst value

	BM				E			
BEST	7.845	8.845	9.845	9.922	5.971	6.971	7.971	8.771
WORST	5.888	6.888	7.888	8.647	1.329	2.250	3.170	4.397

Table 5b: Fuzzy best value and worst value

	M				S			
BEST	7.050	8.050	9.050	9.414	7.736	8.736	9.736	9.868
WORST	2.727	3.693	4.659	5.920	4.492	5.492	6.492	7.730

Table 5c: Fuzzy best value and worst value

	BA			
BEST	5.657	6.657	7.657	8.571
WORST	2.911	3.734	4.557	5.837

Score $\tilde{S}_i$ and $\tilde{R}_i$ are computed respectively in Table 6 as stated in equation (6). According to equation (7) the score $\tilde{S}^+, \tilde{S}^-, \tilde{R}^+$ and $\tilde{R}^-$ are listed below:

The maximum and minimum of the linear normalisation is:

$$\tilde{S}^+ = 0.859, \tilde{S}^- = 0.026$$

$$R^+ = 0.070, R^- = 0.004$$

By making use of equation (9), index VIKOR $\tilde{Q}_{School1}$ are calculated as:

$$\tilde{Q}_i = 0.5 \times \left(\frac{0.859-0.026}{0.859-0.026}\right) + (1-0.5)\left(\frac{0.070-0.004}{0.070-0.004}\right) = 1.000$$

Therefore the values $\tilde{Q}_i$ are shown in Table 6:

Table 6: Ranking of schools

SCHOOLS	S	RANKING	R	RANKING	Q	RANKING
S1	0.859	1	0.070	1	1.000	1
S2	0.723	2	0.053	2	0.792	2
S3	0.687	3	0.052	3	0.761	3
S4	0.026	5	0.004	5	0.000	5
S5	0.183	4	0.027	4	0.268	4

The value of $\tilde{S}_i, \tilde{R}_i$ and $\tilde{Q}_i$ are evaluated for all selected Islamic religious schools by selecting v = 0.5 as shown in Table 6. As defined in Table 6, the larger the $\tilde{Q}_i$, implies the better performance of the schools.

Thus, $A^{(1)} = 1.000, A^{(2)} = 0.792, A^{(3)} = 0.761, A^{(4)} = 0.268$ and $A^{(5)} = 0.000$.

Once the values of $\tilde{S}_i, \tilde{R}_i$ and $\tilde{Q}_i$ are obtained and sorted into descending order, condition 1 is tested if it satisfies the following equation:

$$\tilde{Q}_{\left(A^{(2)}\right)} - \tilde{Q}_{\left(A^{(1)}\right)} \geq DQ \qquad (10)$$

The difference value Q between alternative two $\left(A^{(2)}\right)$ and alternative one $\left(A^{(1)}\right)$ not higher than or equal to DQ. Thus, condition 1 failed to satisfy and condition 2 is tested. The result shows that condition 2 is satisfied. Therefore, the set of compromise solution of the ranking of Islamic religious schools in Perlis is stated as, $School1 \rangle School2 \rangle School3 \rangle School5 \rangle School4$.

4. Conclusion

This study used ~~a~~ Fuzzy VIKOR method to rank Islamic religious schools in Perlis in order to determine the best Islamic religious school. Fuzzy VIKOR was used since this method ranks alternatives and determines the solution named compromise that is the closest to the ideal (Alguliyev, Aliguliyev, & Mahmudova, 2015). By using the data of SPM results for the year 2018, the problem was modelled and solved using Excel. In this method, the ranking of Islamic religious schools is assessed through linguistic variable by trapezoidal fuzzy number and the importance weights of criteria are also in fuzzy number form. By using the suggested approach, the ambiguities involved in the assessment of academic achievement on examination results data could be effectively represented and processed to assure a more effective process. The result shows that school 1 is the best Islamic religious school in Perlis. Based on the results, this study can benefit students and parents especially in determining the best Islamic religious school. In addition, the process and results obtained from this study can give an overview to schools to improve. For better improvement of the result, further study can use other MCDM method such as fuzzy TOPSIS to compare with. Furthermore, the methodology and findings of this study may serve as a point of reference for other schools in their efforts to improve their performance. Potential researcher is recommended to take into account daily schools, boarding schools, religious schools and vocational or technical schools in order to accurately represent the real situation of academic performance of schools in Malaysia.

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