Study on Student's Performance using Single Valued Decagonal Neutrosophic Number in Decision Making Problem

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Abstract

This article presents a new single valued decagonal Neutrosophic number. The single valued decagonal Neutrosophic number is Deneutrosophicated with the help of bounded area method. The bounded area formula is derived. The single valued decagonal Neutrosophic number is used in the decision-making problem. The performance of students is analyzed using a ranking method. The attributes are taken from the problems related to students and teachers. The attributes are ranked through the single valued decagonal Neutrosophic number.

Keywords: Decagonal Neutrosophic number; Bounded area method; Decagonal Neutrosophic decision Matrix; Score function; Decision making problem

1. Introduction

The concept of vagueness is widely used in the fields of science and engineering to handle complex real-world models. Due to its ability to handle different types of problems, multi-criteria decision making has gained widespread attention. The concepts of ambiguity have been heavily revised following the introduction of the fuzzy set by Zadeh and Atanassov. [1,2] In his presentation, Atanassova presents the concept of the intuitionistic fuzzy set, which aims to provide a view of the membership function and its non-member functions. On the other hand, Ye [4] presents the multi-criteria decision-making concept using the same set. In his presentation, Smarandache [5] presents the concept of the Neutrosophic set, which combines the functions of the truth, indeterminacy, and falsity membership. Compared to the usual concepts of the fuzzy and intuitionistic set, the Neutrosophic set is more productive. To address the various issues related to the neutrosophic set, Peng et al. [8,9,10] have started to investigate the various extensions. They have developed hybrid neutrosophic that have triangular and bipolar structures. [11,12]. Biswas, P., Pramanik, S., Giri, B. C. [13] were introduced a new method was then used to rank the alternatives. The best alternative was identified by considering the accuracy function and score Smarandache, F, [14,15] presents the various properties of neutrosophic refined sets. They

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can be used in medical diagnosis. He also introduced the concept of interval-valued fuzzy soft relation. H. Garg,[16] presents the MCDM model that can solve the single-valued Neutrosophic problem. Garg, H.,[17] was presented for the decision-making process in the field of landfill site selection. Aslam, M.,[18] presented a bipolar fuzzy soft set as a solution to the problem. Kharat, M.G., [19] presented a new method for the selection of a landfill site. This article is divided into four sections. The first one introduces the main idea of the paper, while the second one focuses on the case study. The third section explains the algorithm and the calculations. The fourth section concludes the study.

2. Preliminaries

2.1 Definition: Decagonal Neutrosophic number

A single valued Decagonal Neutrosophic number $(\widetilde{D_a})$ is defined as

$$\widetilde{D_a} = [(\varsigma_{1,}\varsigma_{2,}\varsigma_{3,}\varsigma_{4,}\varsigma_{5,}\varsigma_{6,}\varsigma_{7,}\varsigma_{8,}\varsigma_{9}):\alpha],[(\varpi_1,\varpi_2,\varpi_{3,}\varpi_4,\varpi_5,\varpi_{6,}\varpi_7,\varpi_8,\varpi_9):\beta],$$
$$[(\varrho_1,\varrho_2,\varrho_3,\varrho_4,\varrho_{5,}\varrho_{6,}\varrho_7,\varrho_8,\varrho_9):\gamma]$$

Where $\alpha,\beta,\gamma \in [0,1]$

The truth membership function (T_s):$R \to [0,\alpha]$

The indeterminacy membership function (I_s):$R \to [\beta,1]$ ϱ_3

The falsity membership function (F_s): $R \to [\gamma,1]$

2.2 Definition: Bounded area method

The decagonal Neutrosophic number is deneutrosophicated using bounded area method

The deneutrosophication formula for Truth membership function

Area of $\boldsymbol{ABIJ} = \frac{k_1(a_9+a_{10}-a_1-a_2)}{2}$

Area of BCHI $= \frac{(k_2-k_1)(a_9+a_8-a_2-a_3)}{2}$

Area of CDGH $= \frac{(k_3-k_2)(a_8+a_7-a_3-a_4)}{2}$

Area of DEFG $= \frac{(1-k_3)(a_7+a_6-a_4-a_5)}{2}$

$$= \frac{k_1(a_9+a_{10}-a_1-a_2)}{2} + \frac{(k_2-k_1)(a_9+a_8-a_2-a_3)}{2} + \frac{(k_3-k_2)(a_8+a_7-a_3-a_4)}{2} + \frac{(1-k_3)(a_7+a_6-a_4-a_5)}{2}$$

$$\boldsymbol{k_1 = 0.25 \quad k_2 = 0.50 \quad k_3 = 0.75}$$

$$= \frac{(a_9+a_{10}-a_1-a_2)}{8} + \frac{(a_9+a_8-a_2-a_3)}{8} + \frac{(a_8+a_7-a_3-a_4)}{8} + \frac{(a_7+a_6-a_4-a_5)}{8}$$

$$= \frac{(2a_9 + a_{10} + 2a_8 + 2a_7 + a_6 - a_5 - 2a_4 - 2a_3 - 2a_2 - a_1)}{8}$$

The deneutrosophication formula for Indeterminacy membership function

Area of $\boldsymbol{A''B''I''J''} = \frac{(1-k_3)(c_{10}+c_9-c_1-c_2)}{2}$

Area of B''C''H''I'' $= \frac{(k_3-k_2)(c_9+c_8-c_2-c_3)}{2}$

Area of C''D''G''H'' $= \frac{(k_2-k_1)(c_8+c_7-c_3-c_4)}{2}$

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Area of D''E''F''G'' = $\frac{k_1(c_7+c_6-c_4-c_5)}{2}$

$$=\frac{(c_{10}+c_9-c_1-c_2)}{8}+\frac{(c_9+c_8-c_2-c_3)}{8}+\frac{(c_8+c_7-c_3-c_4)}{8}+\frac{(c_7+c_6-c_4-c_5)}{8}$$

$$=\frac{(c_{10}+2c_9+2c_8+2c_7+c_6-c_5-2c_4-2c_3-2c_2-c_1)}{8}$$

Similarly, deneutrosophication formula for falsity

$$=\frac{(b_{10}+2b_9+2b_8+2b_7+b_6-b_5-2b_4-2b_3-2b_2-b_1)}{8}$$

2.3 Definition: score function of single valued Neutrosophic number

The score function formula for single valued Neutrosophic number is given by

$$S=\frac{1}{3}[2+t_j-\Psi_j-X_j]$$

Where $t_j \rightarrow$ truth membership function

$\Psi_j \rightarrow$ indeterminacy membership function

$X_j \rightarrow$ falsity membership function

3. Algorithm

Step1: The single valued decagonal Neutrosophic number decision matrix is considered.

Step 2: The decagonal Neutrosophic number is deneutrosophicated using bounded area method

Step 3: The single valued Neutrosophic number is converted to single valued by using score function for the single valued Neutrosophic number

Step 4: The ranking of the various attributes related to teachers and students is performed in step four.

Step 5: The attributes are ranked and the problem is analyzed.

The attributes which are related to the teachers and their teaching

$P_1 \rightarrow$ good knowledge about the subject

$P_2 \rightarrow$ Interested in teaching

$P_3 \rightarrow$ Dedication to profession

$P_4 \rightarrow$ teaching methodology used by them

$P_5 \rightarrow$ being rude to the students

$P_6 \rightarrow$ failed to give continuous test

$P_7 \rightarrow$ Provided notes and encouraged self-study without working out the problems

The concept which are related to the students are

$S_1 \rightarrow$ interested in subject

$S_2 \rightarrow$ sincere student

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$S_3 \rightarrow$ regular to class

$S_4 \rightarrow$ attentive in class

$S_5 \rightarrow$ lost their confidence level

$S_6 \rightarrow$ failed to understand the concept and lacked in application skill

$S_7 \rightarrow$ had fear for the subject

The decagonal Neutrosophic number is deneutrosophicated using bounded area method

The deneutrosophication formula for Truth membership function

Area of $ABIJ = \frac{k_1(a_9+a_{10}-a_1-a_2)}{2}$

Area of BCHI $= \frac{(k_2-k_1)(a_9+a_8-a_2-a_3)}{2}$

Area of CDGH $= \frac{(k_3-k_2)(a_8+a_7-a_3-a_4)}{2}$

Area of DEFG $= \frac{(1-k_3)(a_7+a_6-a_4-a_5)}{2}$

$$= \frac{k_1(a_9+a_{10}-a_1-a_2)}{2} + \frac{(k_2-k_1)(a_9+a_8-a_2-a_3)}{2} + \frac{(k_3-k_2)(a_8+a_7-a_3-a_4)}{2} + \frac{(1-k_3)(a_7+a_6-a_4-a_5)}{2}$$

$$k_1 = 0.25 \quad k_2 = 0.50 \quad k_3 = 0.75$$

$$= \frac{(a_9+a_{10}-a_1-a_2)}{8} + \frac{(a_9+a_8-a_2-a_3)}{8} + \frac{(a_8+a_7-a_3-a_4)}{8} + \frac{(a_7+a_6-a_4-a_5)}{8}$$

$$= \frac{(2a_9 + a_{10} + 2a_8 + 2a_7 + a_6 - a_5 - 2a_4 - 2a_3 - 2a_2 - a_1)}{8}$$

The deneutrosophication formula for Indeterminacy membership function

Area of $A''B''I''J'' = \frac{(1-k_3)(c_{10}+c_9-c_1-c_2)}{2}$

Area of B''C''H''I'' $= \frac{(k_3-k_2)(c_9+c_8-c_2-c_3)}{2}$

Area of C''D''G''H'' $= \frac{(k_2-k_1)(c_8+c_7-c_3-c_4)}{2}$

Area of D''E''F''G'' $= \frac{k_1(c_7+c_6-c_4-c_5)}{2}$

$$= \frac{(c_{10} + c_9 - c_1 - c_2)}{8} + \frac{(c_9 + c_8 - c_2 - c_3)}{8} + \frac{(c_8 + c_7 - c_3 - c_4)}{8} + \frac{(c_7 + c_6 - c_4 - c_5)}{8}$$

$$= \frac{(c_{10} + 2c_9 + 2c_8 + 2c_7 + c_6 - c_5 - 2c_4 - 2c_3 - 2c_2 - c_1)}{8}$$

Similarly, deneutrosophication formula for falsity

$$= \frac{(b_{10} + 2b_9 + 2b_8 + 2b_7 + b_6 - b_5 - 2b_4 - 2b_3 - 2b_2 - b_1)}{8}$$

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	P_1	P_2	P_3	P_4
S_1	(0.71,0.72,0.73,0.74,0.75,0.76,0.78,0.79,0.80,0.81; 0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.290.30; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)	(0.61,0.620.64,0.67,0.68,0.69,0.70,0.72,0.73,0.74; 0.11,0.13,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22; 0.410.43,0.45,0.47,0.49,0.50,0.52,0.53,0.54,0.55)	(0.81,0.83,0.84,0.85,0.86,0.88,0.89,0.90,0.91,0.92; 0.21,0.23,0.25,0.27,0.28,0.29,0.30,0.32,0.33,0.35; 0.61,0.62,0.64,0.65,0.67,0.70,0.71,0.73,0.740.75)	(0.90,0.92,0.92,0.930.93,0.94,0.95,0.960.97,0.98 0.11,0.12,0.13,0.14,0.16,0.17,0.18,0.18,0.19,0.20; 0.41,0.43,0.45,0.47,0.49,0.50,0.51,0.52,0.53,0.61)
S_2	(0.81,0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90; 0.10,0.11,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.51,0.52,0.54,0.55,0.58,0.59,0.60,0.61,0.63,0.64)	(0.71,0.73,0.75,0.77,0.79,0.80,0.81,0.83,0.84,0.85; 0.11,0.12,0.13,0.15,0.17,0.18,0.19,0.20,0.21,0.22; 0.51,0.54,0.56,0.56,0.57,0.59,0.62,0.63,0.64,0.70)	(0.91,0.92,0.94,0.95,0.97,0.97,0.98,0.99,0.99,0.99; 0.31,0.32,0.33,0.34,0.35,0.37,0.38,0.39,0.40,0.41; 0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21)	(0.71,0.72,0.73,0.73,0.74,0.75,0.76,0.77,0.78,0.79; 0.23,0.24,0.26,0.27,0.28,0.29,0.30,0.31,0.32,0.33; 0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.29,0.29)
S_3	(0.71,0.72,0.73,0.74,0.75,0.76,0.77,0.78,0.79,0.80; 0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.30,0.31; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20)	(0.93,0.94,0.95,0.96,0.97,0.98,0.98,0.99,0.99,0.99; 0.31,0.32,0.33,0.34,0.35,0.36,0.36,0.37,0.38,0.39; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20)	(0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90,0.91; 0.20,0.21,0.22,0.23,0.24,0.26,0.27,0.28,0.29,0.30; 0.51,0.52,0.53,0.54,0.54,0.55,0.56,0.57,0.58,0.59)	(0.81,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90,0.91; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.61,0.62)
S_4	(0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93; 0.25,0.26,0.27,0.28,0.29,0.30,0.31,0.32,0.33,0.34; 0.55,0.56,0.57,0.58,0.59,0.60,0.61,0.62,0.63,0.65)	(0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94; 0.23,0.24,0.25,0.26,0.27,0.28,0.29,0.30,0.31,0.32; 0.16,0.17,0.18,0.19,0.19,0.20,0.20,0.21,0.21,0.22)	(0.66,0.67,0.68,0.69,0.70,0.72,0.74,0.74,0.75,0.76; 0.11,0.12,0.13,0.14,0.15,0.16,0.16,0.17,0.18,0.19; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)	(0.78,0.79,0.80,0.81,0.82,0.83,0.84,0.85,0.86,0.87; 0.23,0.24,0.25,0.25,0.26,0.27,0.27,0.28,0.29,0.30; 0.15,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22,0.23)
S_5	(0.95,0.96,0.97,0.98,0.99,0.99,0.99,0.99,0.99; 0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21; 0.25,0.26,0.27,0.28,0.29,0.29,0.30,0.31,0.32)	(0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94,0.95,0.96; 0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.580.59)	(0.91,0.92,0.93,0.94,0.95,0.96,0.96,0.97,0.98,0.99; 0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22,0.23,0.24; 0.62,0.63,0.64,0.65,0.66,0.71,0.72,0.73,0.740.75)	(0.85,0.86,0.87,0.88,0.89,0.91,0.92,0.93,0.94,0.95; 0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22; 0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.61,0.62)
S_6	(0.96,0.97,0.98,0.98,0.98,0.98,0.99,0.99,0.99,0.99; 0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22 0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.61)	(0.85,0.86,0.87,0.88,0.88,0.89,0.90,0.91,0.92,0.93; 0.20,0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.29; 0.61,0.62,0.63,0.64,0.65,0.66,0.67,0.68,0.690.70)	(0.84,0.84,0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92; 0.21,0.22,0.23,0.24,0.25,0.26,0.26,0.27,0.28,0.29; 0.43,0.44,0.45,0.46,0.47,0.48,0.49,0.50,0.51,0.52)	(0.93,0.96,0.97,0.98,0.98,0.98,0.99,0.99,0.99,0.99; 0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.29,0.30; 0.55,0.56,0.57,0.58,0.59,0.60,0.61,0.62,0.63,0.64)
S_7	(0.91,0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,0.99; 0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21; 0.61,0.62,0.63,0.64,0.65,0.66,0.67,0.68,0.69,0.70)	(0.81,0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.63,0.64,0.65,0.66,0.67,0.68,0.69,0.70,0.71,0.73)	(0.81,0.82,0.83,0.84,0.850.86,0.87,0.88,0.890.90; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.510.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)	(0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90,0.91; 0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.29,0.30; 0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21)

Table 1: Single Valued Decagonal Decision Matrix

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	P_5	P_6	P_7
S_1	(0.82,0.84,0.85,0.87,0.88,0.89,0.90,0.91,0.92,0.93,; 0.13,0.140.15,0.16,0.17,0.18,0.19,0.20,0.210.23; 0.31,0.32,0.33,0.34,0.35,0.36,0.37,0.38,0.39,0.40)	(0.90,0.91,0.91,0.92,0.92,0.93,0.94,0.95,0.96,0.97; 0.21,0.22,0.23,0.25,0.26,0.27,0.28,0.29,0.30,0.31; 0.51,0.52,0.53,0.54,0.56,0.58,0.59,0.60,0.61,0.62)	(0.81,0.82,0.83,0.85,0.87,0.88,0.89,0.90,0.91,0.92; 0.21,0.22,0.23,0.24,0.25,0.27,0.28,0.29,0.30,0.31; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)
S_2	(0.91,0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,0.99; 0.21,0.22,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.28; 0.51,0.52,0.53,0.53,0.54,0.55,0.56,0.57,0.58,0.59)	(0.71,0.72,0.73,0.74,0.75,0.76,0.77,0.78,0.80,0.81; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.19; 0.41,0.42,0.43,0.44,0.45,0.46,0.47,0.48,0.49,0.49)	(0.81,0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.89 0.31,0.32,0.33,0.34,0.35,0.36,0.37,0.38,0.39,0.40; 0.01,0.02,0.03,0.04,0.05,0.06,0.07,0.08,0.09,0.10)
S_3	(0.73,0.74,0.75,0.76,0.77,0.78,0.80,0.81,0.82,0.83; 0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22,0.23; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)	(0.91,0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,0.99; 0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.20,0.21,0.22; 0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.62,0.63)	(0.74,0.75,0.76,0.77,0.78,0.80,0.82,0.83,0.84,0.85; 0.21,0.22,0.23,0.24,0.26,0.28,0.29,0.30,0.31,0.32; 0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.61,0.62)
S_4	(0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94,0.95; 0.25,0.26,0.27,0.28,0.29,0.30,0.31,0.32,0.33,0.34; 0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22,0.23,0.24)	(0.88,0.89,0.900.91,0.92,0.93,0.93,0.94,0.95,0.96; 0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22,0.23,0.24; 0.05,0.06,0.07,0.08,0.09,0.10,0.11,0.12,0.13,0.14)	(0.75,0.76,0.77,0.78,0.79,0.80,0.81,0.82,0.83,0.84; 0.58,0.59,0.60,0.61,0.62,0.63,0.64,0.65,0.66,0.67; 0.07,0.07,0.08,0.08,0.09,0.10,0.11,0.12,0.13,0.14)
S_5	(0.78,0.79,0.80,0.81,0.82,0.83,0.84,0.85,0.86,0.87; 0.21,0.24,0.26,0.28,0.30,0.31,0.32,0.33,0.34,0.35; 0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60,0.61)	(0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.63,0.64,0.65,0.66,0.67,0.68,0.69,0.70,0.71,0.72)	(0.73,0.74,0.75,0.76,0.77,0.78,0.79,0.80,0.81,0.82; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)
S_6	(0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.89,0.90,0.91; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.51,0.52,0.53,0.54,0.55,0.56,0.57,0.58,0.59,0.60)	(0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94; 0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20; 0.61,0.62,0.63,0.64,0.65,0.66,0.67,0.68,0.69,0.70)	(0.81,0.82,0.83,0.84,0.85,0.86,0.87,0.88,0.890.90; 0.13,0.14,0.15,0.16,0.17,0.18,0.19,0.20,0.21,0.22 0.62,0.63,0.64,0.65,0.66,0.670.68,0.69,0.70,0.71)
S_7	(0.75,0.76,0.77,0.78,0.79,0.80,0.81,0.82,0.83,0.84; 0.43,0.44,0.45,0.46,0.47,0.48,0.49,0.50,0.51,0.52; 0.20,0.21,0.22,0.23,0.24,0.25,0.26,0.27,0.28,0.30)	(0.85,0.86,0.87,0.88,0.89,0.90,0.91,0.92,0.93,0.94; 0.31,0.32,0.33,0.34,0.35,0.36,0.37,0.38,0.39,0.40; 0.63,0.64,0.65,0.66,0.67,0.68,0.69,0.70,0.71,0.72)	(0.93,0.94,0.94,0.95,0.96,0.96,0.97,0.98,0.98,0.99; 0.10,0.11,0.12,0.13,0.14,0.15,0.16,0.17,0.18,0.19; 0.65,0.66,0.67,0.68,0.69,0.70,0.71,0.71,0.72,0.73)

Table 2: Single Valued Neutrosophic Decision Matrix

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	P_1	P_2	P_3	P_4	P_5	P_6	P_7
S_1	(0.05875,0.05, 0.05)	(0.0725,0.055 ,0.07875)	(0.06125,0.06875, 0.08875)	(0.03875,0.0525, 0.07875)	(0.0575,0.05125, 0.05)	(0.0375,0.05625, 0.06875)	(0.065,0.06, 0.05)
S_2	(0.05,0.05375, 0.075)	(0.07625,0.065 ,0.08375)	(0.0475,0.06, 0.05)	(0.04375,0.05375, 0.04875)	(0.04875,0.045, 0.04375)	(0.05375,0.04875, 0.04875)	(0.04875,0.05, 0.05)
S_3	(0.05,0.05375, 0.05)	(0.03625,0.04125 ,0.05)	(0.05,0.06, 0.04125)	(0.05125,0.05 ,0.05)	(0.05875,0.05 ,0.05)	(0.04875,0.04375, 0.05375)	(0.06875,0.06875, 0.05)
S_4	(0.04125,0.05, 0.05125)	(0.05,0.05, 0.02875)	(0.0625,0.04125, 0.05)	(0.05,0.035, 0.04875)	(0.05,0.05, 0.05)	(0.04125,0.05, 0.05)	(0.05,0.05, 0.0425)
S_5	(0.02125,0.05, 0.03625)	(0.05,0.05, 0.04625)	(0.04125,0.05, 0.09)	(0.06,0.05, 0.05)	(0.05,0.07125, 0.05)	(0.05,0.05, 0.05)	(0.05,0.05,0.05)
S_6	(0.01375,0.05 ,0.05)	(0.04125,0.05 ,0.05)	(0.04875,0.04125, 0.05)	(0.0225,0.05, 0.05)	(0.05,0.05, 0.05)	(0.05,0.05 ,0.05)	(0.05,0.05,0.05)
S_7	(0.04875,0.05, 0.05)	(0.05,0.05, 0.05125)	(0.05,0.05, 0.05)	(0.05,0.05, 0.05)	(0.05,0.05, 0.05125)	(0.05,0.05 ,0.05)	(0.0325,0.05, 0.05)

Table 3: Multi Valued Neutrosophic Decision Matrix

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Table 4: Decision Matrix after Deneutrosophication

	P_1	P_2	P_3	P_4	P_5	P_6	P_7
S_1	0.6529	0.64625	0.6346	0.6358	0.6521	0.6375	0.6517
S_2	0.6404	0.6425	0.6458	0.6471	0.6533	0.6520	0.6496
S_3	0.6488	0.6483	0.6495	0.6504	0.6529	0.6504	0.65
S_4	0.6467	0.6571	0.6571	0.6554	0.65	0.6471	0.65
S_5	0.645	0.6513	0.6638	0.6533	0.6429	0.65	0.65
S_6	0.6379	0.6471	0.6525	0.6408	0.65	0.65	0.65
S_7	0.6496	0.6496	0.65	0.65	0.6496	0.65	0.6442

The score function formula for single valued Neutrosophic number

$$\boldsymbol{S} = \frac{\mathbf{1}}{\mathbf{3}}[\mathbf{2} + \boldsymbol{t_j} - \boldsymbol{\Psi}_{\mathrm{j}} - \mathbf{X}_{\mathrm{j}}]$$

Where $\boldsymbol{t_j}$ → truth membership function

$\boldsymbol{\Psi_j}$ → indeterminacy membership function

$\mathbf{X}_j$ → falsity membership function

$SVDNN(P_1) = 0.6459$
$SVDNN(P_2) = 0.6488$
$SVDNN(P_3) = 0.6505$
$SVDNN(P_4) = 0.6475$
$SVDNN(P_5) = 0.6501$
$SVDNN(P_6) = 0.6481$
$SVDNN(P_7) = 0.6494$
Ranking of the attributes
0.6505 >> 0.6501 >> 0.6494 >> 0.6488 >> 0.6481 >> 0.6475 >> 0.6459
Ranking of the alternatives of the students

$$SVNN(S_1) = 0.6444$$
$$SVNN(S_2) = 0.6472$$
$$SVNN(S_2) = 0.6500$$
$$SVNN(S_3) = 0.6519$$
$$SVNN(S_4) = 0.6509$$
$$SVNN(S_5) = 0.6469$$
$$SVNN(S_6) = 0.649$$

0.6519 >> 0.6509 >> 0.6500 >> 0.649 >> 0.6472 >> 0.6469 >> 0.6444

$$S_4 \gg S_5 \gg S_3 \gg S_7 \gg S_2 \gg S_6 \gg S_1$$

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4. Conclusion and Interpretation:

The single-valued Neutrosophic number used to rank the attributes of teachers is used to analyze and solve the problem. It is revealed that dedication to the profession is ranked first, followed by providing notes and encouraging self-study. On the other hand, interest in teaching is ranked second, followed by good knowledge about the subject is ranked third, and the student's performance in the exam is linked to the teacher's attitude. The results of the study suggest that the student's performance will be improved if the teacher dedicates more time and effort to his or her profession. The results of the study also suggest that the student's performance will be affected by the teacher's attitude. For instance, if the teacher is rude to the students, the student's performance will be lower. The study also revealed that the level of confidence that the students have in the subject they are studying is affected by the teacher's attitude. In addition, the students' level of interest in the subject is also affected by the teacher's attitude. The results of this study suggest that the more attentive a student is in class, the higher their performance. On the other hand, the more confident they are, the lower their performance.

To improve the student's performance

i) Before starting a new school year, students should establish a goal for their career and meet with their academic advisor.

ii) Students have to meet their academic advisor to discuss class schedule and career goals.

iii) Students should clarify their doubts regarding the subjects with the subject teacher without fear. They should also talk to their teachers about the subjects they are studying.

iv) Students should develop self quizzes and pre tests

v) Students should discuss about the subjects with their classmates

vi) Students should additionally take care of their mental and physical health.

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