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Dynamic Neutrosophic Cubic Sets for Quality Analysis of Curriculum Development and Teaching Practice for Digital Literacy of Music Education Majors in the Age of Artificial Intelligence

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Abstract: Developing digital literacy among music education majors has emerged as a crucial element of higher education reform in the age of artificial intelligence (AI). With an emphasis on the incorporation of AI technology and cutting-edge pedagogical approaches, this study performs a quality analysis of curriculum creation and teaching methods for digital literacy in music education programs. Curriculum relevance to AI-driven music education, the efficacy of teaching methods, the growth of students' digital literacy, and resource and infrastructure support are the four main assessment criteria that have been developed. The research shows that to prepare future music educators to adjust to digital developments in the industry, practice-oriented instruction in conjunction with a strong alignment between curriculum design and technology trends is crucial. This study uses the Dynamic Neutrosophic Cubic Sets to solve uncertainty information. We use four criteria and eight alternatives. Additionally, a key route to developing creativity, flexibility, and technical proficiency is the efficient application of project-based learning, blended learning, and AI-powered music tools. According to the conclusions, colleges must provide continuous curriculum renewal, foster cross-disciplinary partnerships, and have a strong technology infrastructure.

Keywords: Dynamic Neutrosophic Cubic Sets; Curriculum Development; Digital Literacy of Music Education; Artificial Intelligence.

1. Introduction

Neutrosophic sets (NSs) [1]can express incomplete, uncertain, and inconsistent information represented by truth, indeterminacy, and falsity degrees, while intuitionistic fuzzy sets and interval-valued intuitionistic fuzzy sets are represented by both membership and non-membership degrees. The classic fuzzy set described by fuzzy information has only one membership degree. Simplified NSs, a subset of NS, included the ideas of interval-valued NSs for uncertain information of truth, indeterminacy, and falsity and single-valued NSs for certain

information of truth, indeterminacy, and falsity. These concepts were then effectively used in the decision-making questions.

According to Jun et al.[2], cubic sets are made up of an uncertain degree represented by an interval value and a known degree represented by an exact value. To express the partial certain and partly uncertain knowledge of the truth, indeterminacy, and falsehood concurrently, Ali et al. and Jun et al. [3], [4]extended cubic sets to the neutrosophic sets and created a neutrosophic cubic set (NCS), which is composed of a single valued neutrosophic set and an interval valued neutrosophic set. Ye also described the fundamental functions and NCS aggregation mechanism.

The main contributions of this study are:

This study uses the Dynamic Neutrosophic Cubic Sets to solve uncertainty information in the decision-making process.

This study proposes a methodology to rank the alternatives based on the neutrosophic set.

This study used the function to obtain final score.

The alternatives are ranked based on the highest value.

Below is the construction of the study. Related work of this study is presented in section 2. The fundamental idea of NCSs is presented in Section 3 to illustrate the time-variant neutrosophic cubic information with respect to various time intervals. Section 4 shows the and the definition of DNCSs. In addition, Section 5 proposes an approach in the time-variant neutrosophic cubic settings. To demonstrate the use of the suggested technique, an example is provided in section 6. Future research and conclusions are included in the last section.

2. Literature Review

Determining the artificial intelligence literacy levels of music instructors is the goal of study of Üçer et al. [5]. The survey approach, which falls within the quantitative research paradigm, was used to perform the study. 132 music instructors employed by public schools made up the research group, which was chosen to use the conveniently available case sample methodology, one of the deliberate sampling techniques. Music teachers' artificial intelligence literacy skills were assessed during the data gathering procedure using the "Artificial Intelligence Level Scale." Prior to deciding the statistical procedures to do, normality analyses were conducted on the data.

By creating a music generating system based on a sophisticated Transformer model, chen et al. [6]responds to the demands of the music generation industry. The system includes a music emotion-driven multi-task learning architecture and an adaptive music feature encoder. Through the integration of dynamic weight modification and knowledge of music theory, the adaptive encoder can precisely capture a variety of musical genres and emotional traits. Using emotion tags, the multi-task learning framework improves the model's capacity to produce emotionally

complex music. According to experimental data, the suggested approach significantly improves performance on the Lakh MIDI Dataset (LMD).

Cyberspace, which includes digital devices, communication systems, computer systems, artificial intelligence (AI), information technology, and the data, services, and apps they contain, is developing at a rate never seen before. Supporting the creation of pedagogical expert systems to address the present issues of a shortage of instructors and a lack of specialized teaching materials in music pedagogy reform and to make resource sharing a reality is no longer a pipe dream. In the field of education, artificial intelligence systems not only challenge the conventional paradigm of music instruction but also foster its advancement. Wang [7]presented the artificial intelligence concept, examines the issues facing college music education, and proposes an artificial intelligence-based voice teaching system.

3. Neutrosophic cubic sets

This section shows the definitions of neutrosophic cubic sets[8].

The neutrosophic cubic sets (NCS) are defined as:

$$D = \left\{[T^-(V), T^+(V)], [I^-(V), I^+(V)], [F^-(V), F^+(V)]\ , \left(A(V), B(V), C(V)\right)\right\}$$

Where $[T^-(V), T^+(V)], [I^-(V), I^+(V)], [F^-(V), F^+(V)]$ are interval valued neutrosophic set (IVNS) and $\left(A(V), B(V), C(V)\right)$ are membership values of single valued neutrosophic set (SVNS).

$$\left(A(V), B(V), C(V)\right) \in [0,1]$$

$$D = \left\{(T, I, F)\ , \left(A(V), B(V), C(V)\right)\right\}$$

$$T = [T^-, T^+]$$

$$I = [I^-, I^+]$$

$$F = [F^-, F^+]$$

4. Dynamic neutrosophic cubic sets (DNCS)

This section shows the definitions of DNCS.

The DNCS can be expressed as:

$$D(t) = \left\{\begin{pmatrix}\left[T^-(t_j, V), T^+(t_j, V)\right], \\ \left[I^-(t_j, V), I^+(t_j, V)\right], \\ \left[F^-(t_j, V), F^+(t_j, V)\right]\end{pmatrix}, \left(A(t_j, V), B(t_j, V), C(t_j, V)\right)\right\}$$

The relations of two DNCS are expressed as:

$$D_1^c(t) = \left\{\begin{pmatrix}\left[F_{D_1}^-(t_j, V), {F_{D_1}}^+(t_j, V)\right], \\ \left[1 - I_{D_1}^-(t_j, V), 1 - {I_{D_1}}^+(t_j, V)\right], \\ \left[T_{D_1}^-(t_j, V), {T_{D_1}}^+(t_j, V)\right]\end{pmatrix}, \left(C(t_j, V), 1 - B(t_j, V), A(t_j, V)\right)\right\}$$

$$D_1(t) \cup D_2(t) = \left\{ \begin{pmatrix} [T_{D_1}^-(t_j,V) \vee T_{D_2}^-(t_j,V), {T_{D_1}}^+(t_j,V) \vee {T_{D_2}}^+(t_j,V)], \\ [I_{D_1}^-(t_j,V) \wedge I_{D_2}^-(t_j,V), {I_{D_1}}^+(t_j,V) \wedge {I_{D_2}}^+(t_j,V)], \\ [F_{D_1}^-(t_j,V) \wedge F_{D_2}^-(t_j,V), {F_{D_1}}^+(t_j,V) \wedge {F_{D_2}}^+(t_j,V)] \end{pmatrix}, \begin{pmatrix} A_1(t_j,V) \vee A_2(t_j,V), \\ B_1(t_j,V) \wedge B_2(t_j,V), \\ C_1(t_j,V) \wedge C_2(t_j,V) \end{pmatrix} \right\}$$

$$D_1(t) \cap D_2(t) = \left\{ \begin{pmatrix} [T_{D_1}^-(t_j,V) \wedge T_{D_2}^-(t_j,V), {T_{D_1}}^+(t_j,V) \wedge {T_{D_2}}^+(t_j,V)], \\ [I_{D_1}^-(t_j,V) \vee I_{D_2}^-(t_j,V), {I_{D_1}}^+(t_j,V) \vee {I_{D_2}}^+(t_j,V)], \\ [F_{D_1}^-(t_j,V) \vee F_{D_2}^-(t_j,V), {F_{D_1}}^+(t_j,V) \vee {F_{D_2}}^+(t_j,V)] \end{pmatrix}, \begin{pmatrix} A_1(t_j,V) \wedge A_2(t_j,V), \\ B_1(t_j,V) \vee B_2(t_j,V), \\ C_1(t_j,V) \vee C_2(t_j,V) \end{pmatrix} \right\}$$

The operations of two DNCS are expressed as:

$$D_1(t) \oplus D_2 = \left\{ \begin{pmatrix} \begin{bmatrix} T_{D_1}^-(t_j,V) + T_{D_2}^-(t_j,V) - T_{D_1}^-(t_j,V) T_{D_1}^-(t_j,V), \\ {T_{D_1}}^+(t_j,V) + {T_{D_2}}^+(t_j,V) - {T_{D_1}}^+(t_j,V) {T_{D_2}}^+(t_j,V) \end{bmatrix}, \\ [I_{D_1}^-(t_j,V) I_{D_2}^-(t_j,V), {I_{D_1}}^+(t_j,V) {I_{D_2}}^+(t_j,V)], \\ \left[[F_{D_1}^-(t_j,V) F_{D_2}^-(t_j,V), {F_{D_1}}^+(t_j,V) {F_{D_2}}^+(t_j,V)] \right] \end{pmatrix}, \begin{pmatrix} A_1(t_j,V) + A_2(t_j,V) - A_1(t_j,V) A_2(t_j,V), \\ B_1(t_j,V) B_2(t_j,V), \\ C_1(t_j,V) C_2(t_j,V) \end{pmatrix} \right\}$$

$$D_1(t) \otimes D_2 = \left\{ \begin{pmatrix} \begin{bmatrix} T_{D_1}^-(t_j,V) T_{D_1}^-(t_j,V), \\ {T_{D_1}}^+(t_j,V) {T_{D_2}}^+(t_j,V) \end{bmatrix}, \\ \begin{bmatrix} I_{D_1}^-(t_j,V) + I_{D_2}^-(t_j,V) - I_{D_1}^-(t_j,V) I_{D_2}^-(t_j,V), \\ {I_{D_1}}^+(t_j,V) + {I_{D_2}}^+(t_j,V) - {I_{D_1}}^+(t_j,V) {I_{D_2}}^+(t_j,V) \end{bmatrix}, \\ \begin{bmatrix} F_{D_1}^-(t_j,V) + F_{D_2}^-(t_j,V) - F_{D_1}^-(t_j,V) F_{D_2}^-(t_j,V), \\ {F_{D_1}}^+(t_j,V) + {F_{D_2}}^+(t_j,V) - {F_{D_1}}^+(t_j,V) {F_{D_2}}^+(t_j,V) \end{bmatrix} \end{pmatrix}, \begin{pmatrix} A_1(t_j,V) A_2(t_j,V), \\ B_1(t_j,V) + B_2(t_j,V) - B_1(t_j,V) B_2(t_j,V), \\ C_1(t_j,V) + C_2(t_j,V) - C_1(t_j,V) C_2(t_j,V) \end{pmatrix} \right\}$$

This part shows function of DNCSs.

$$U(D_1, D_2) = \frac{\begin{pmatrix} |T_{D_1}^- - T_{D_2}^-| + |T_{D_1}^+ - T_{D_2}^+| + |I_{D_1}^- - I_{D_2}^-| + |I_{D_1}^+ - I_{D_2}^+| + |F_{D_1}^- - F_{D_2}^-| + |F_{D_1}^+ - F_{D_2}^+| + \\ |A_{D_1} - A_{D_2}| + |B_{D_1} - B_{D_2}| + |C_{D_1} - C_{D_2}| \end{pmatrix}}{9}$$

5. Quality Analysis of Curriculum Development Methodology

This section shows the Quality Analysis of Curriculum Development Methodology to show the rank of alternatives. Figure 1 shows the steps of the flowchart.

Let $D = \{D_1, D_2, \dots, D_m\}$ is a set of alternatives and $Z = \{Z_1, Z_2, \dots, Z_n\}$ is a set of criteria and $t = \{i_1, t_2, \dots, t_k\}$. Table 1 shows the characteristic values between alternatives and time sequence. Table 2 shows the characteristic values between alternatives and criteria.

Table 1. Characteristic values between criteria and time sequence.

	Z_1	Z_2	…	Z_n
t_1	$U(t_1,z_1)$	$U(t_1,z_2)$	…	$U(t_1,z_n)$
t_2	$U(t_2,z_1)$	$U(t_2,z_2)$	…	$U(t_2,z_n)$
…	…	…	…	…
T_k	$U(t_k,z_1)$	$U(t_k,z_2)$	…	$U(t_k,z_n)$

Table 2. Characteristic values between criteria and alternatives.

	Z_1	Z_2	…	Z_n
D_1	$U(z_1)$	$U(z_2)$	…	$U(z_n)$
D_2	$U(z_1)$	$U(z_2)$	…	$U(z_n)$
…	…	…	…	…
D_k	$U(z_1)$	$U(z_2)$	…	$U(z_n)$

Step 1. Create the decision matrix.

Experts define the criteria and alternatives and then create the decision matrix using the DNCS to obtain different matrices.

Step 2. Combine the decision matrix.

Step 3. Apply the function between criteria and alternatives.

$$U(D_1,D_2)=\frac{\begin{pmatrix}\left|T_{D_1}^{-}-T_{D_2}^{-}\right|+\left|T_{D_1}^{+}-T_{D_2}^{+}\right|+\left|I_{D_1}^{-}-I_{D_2}^{-}\right|+\left|I_{D_1}^{+}-I_{D_2}^{+}\right|+\left|F_{D_1}^{-}-F_{D_2}^{-}\right|+\left|F_{D_1}^{+}-F_{D_2}^{+}\right|+\\ \left|A_{D_1}-A_{D_2}\right|+\left|B_{D_1}-B_{D_2}\right|+\left|C_{D_1}-C_{D_2}\right|\end{pmatrix}}{9}$$

Step 4. Rank the options.

Step 5. End

Figure 1. Steps of flowchart.

6. Quality Analysis of Curriculum Development Example

Artificial intelligence (AI) has emerged as a major force behind the transformation of educational paradigms due to the quick development of information technology. Through the provision of intelligent music notation systems, real-time feedback mechanisms, and tailored learning routes, artificial intelligence (AI) technology greatly enhances teaching strategies and learning experiences in the field of music education. But even if AI is being used extensively in many areas of education, thorough study and methodical implementation in music education are still in their infancy.

The complexity of music theory, the accuracy of performing skills, and the subjectivity of creative expression are just a few of the special challenges that come with teaching music. Because of these traits, traditional teaching approaches frequently fall short of meeting the demands of both teachers and students. Furthermore, processing vast volumes of audio data is necessary for the analysis and comprehension of musical compositions; this is a difficult and time-consuming problem that current technologies are still working to fully resolve.

This study uses four criteria and eight alternatives as shown in Figure 2.

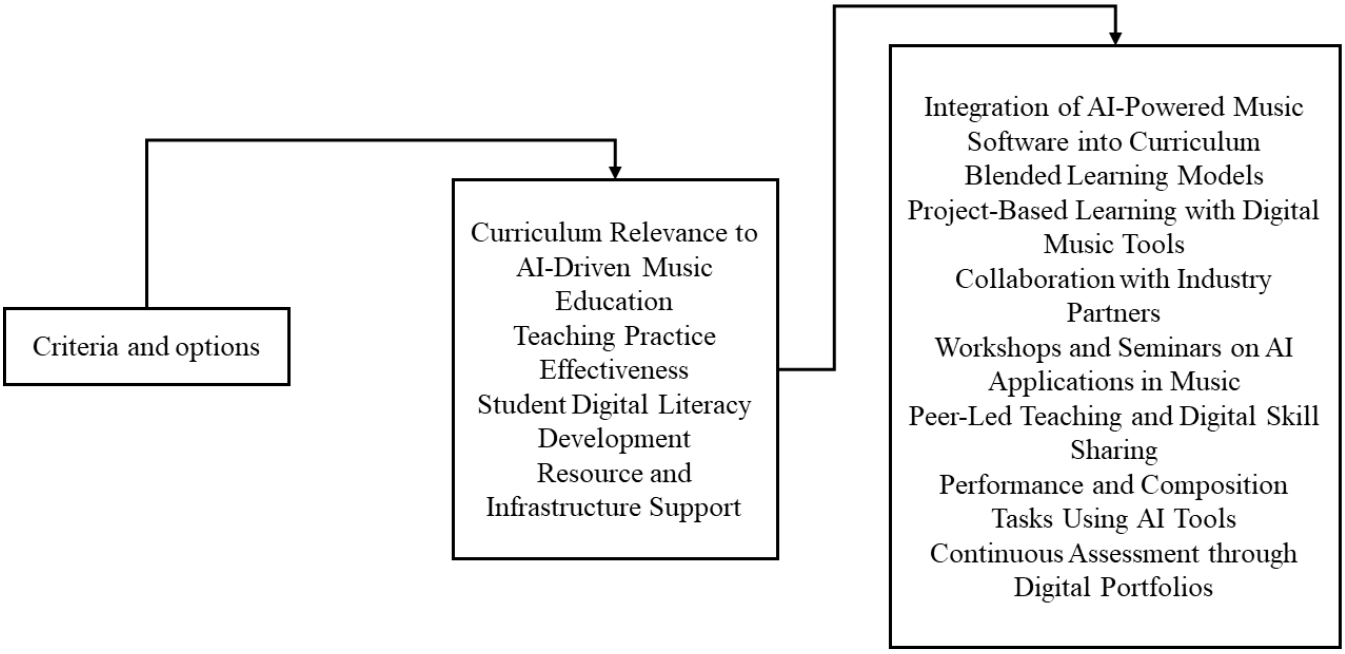

Figure 2. Characteristics of criteria and options.

Three experts created the decision matrix as shown in Table 3. These matrices are combined into a single matrix.

Table 3. Characteristics values.

	Z_1	Z_2	Z_3	Z_4
D_1	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))
D_2	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D_3	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D_4	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))
D_5	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))
D_6	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D_7	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))
D_8	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))
	Z_1	Z_2	Z_3	Z_4
D_1	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))
D_2	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))
D_3	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))
D_4	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))
D_5	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))

D6	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))
D7	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D8	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))
	Z_1	Z_2	Z_3	Z_4
D1	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.6,0.8],[0.2,0.4],[0.0,0.1],(0.7,0.3,0.0))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))
D2	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D3	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))
D4	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))
D5	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))
D6	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))
D7	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))	([0.2,0.4],[0.1,0.3],[0.4,0.6],(0.3,0.2,0.5))	([0.5,0.7],[0.2,0.4],[0.0,0.2],(0.6,0.3,0.1))	([0.7,0.9],[0.0,0.2],[0.0,0.2],(0.8,0.1,0.1))
D8	([0.3,0.5],[0.2,0.7],[0.0,0.1],(0.4,0.6,0.0))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.1,0.3],[0.1,0.3],[0.5,0.7],(0.2,0.2,0.6))	([0.0,0.2],[0.1,0.3],[0.6,0.8],(0.1,0.2,0.7))

The function between the criteria and alternatives are applied to obtain final score as shown in Figure 3. Ranks of alternatives are obtained as shown in Figure 4.

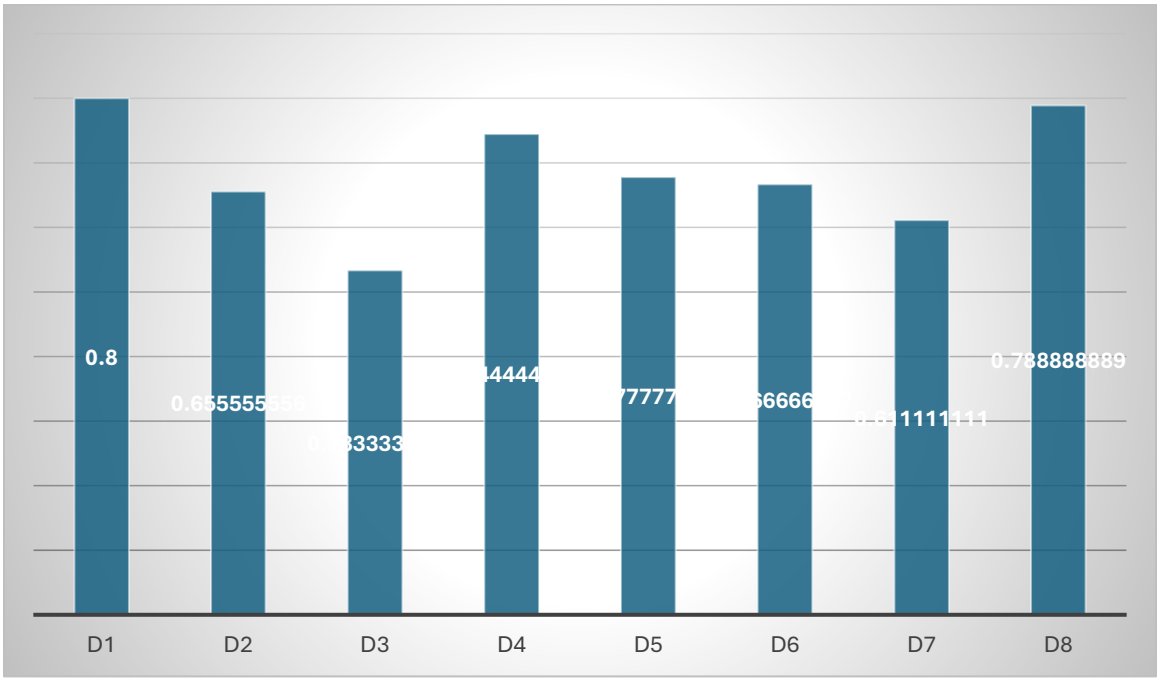

Figure 3. Final score.

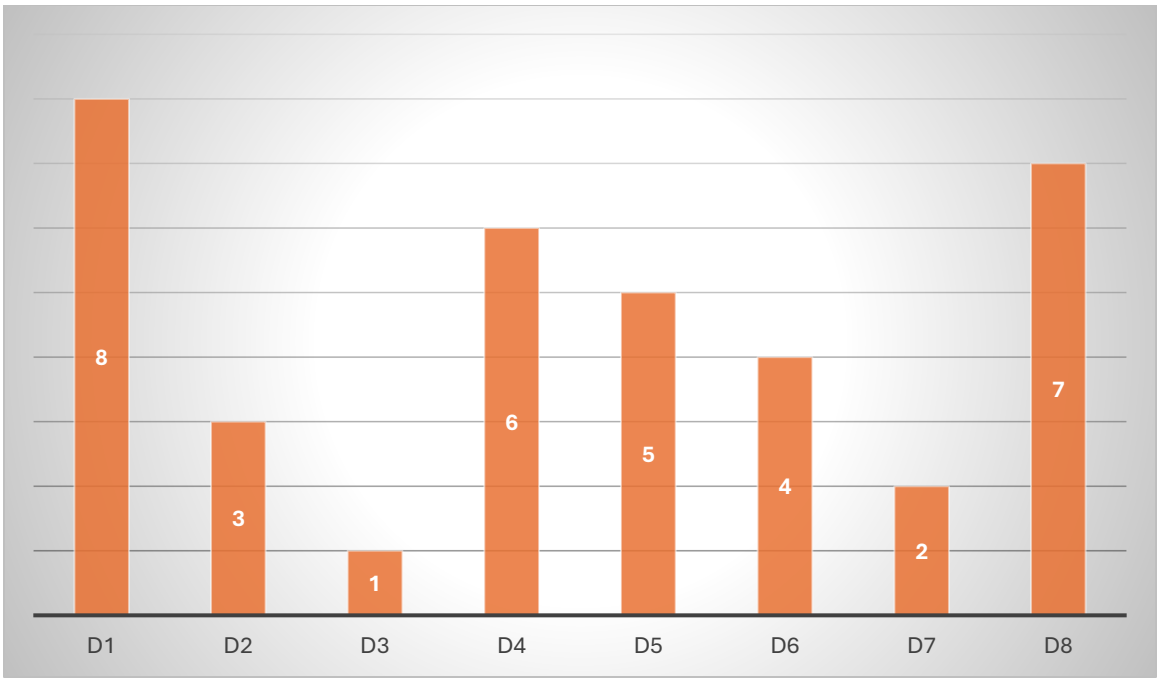

Figure 4. Ranks.

7. Conclusions and Future Studies

According to the study's findings, effective curriculum design and instruction for music education majors in the AI era necessitate a well-rounded strategy that incorporates both contemporary digital competences and conventional creative abilities. According to the review, digital literacy is not just a technical ability but also a crucial part of creative pedagogy, allowing students to experiment with new approaches to teaching, performing, and composing music. The dual challenges of promoting innovation and preserving the artistic and cultural underpinnings of music instruction must be addressed by universities. This study used the neutrosophic set to solve uncertainty information.

The ongoing improvement of institutional resources, teacher preparation, and student-centered educational approaches are also essential to the success of these programs. AI-powered tools have the potential to greatly improve music instruction, but to have long-term educational value, they must be carefully matched with learning goals.

The future studies are: Curriculum Innovation and Renewal – Future research should explore frameworks for continuously updating music education curricula to remain responsive to emerging AI technologies. Cross-Disciplinary Integration – There is a need to strengthen interdisciplinary connections between music education, computer science, and digital media to enrich student learning experiences. Teacher Training and Professional Development – Universities should develop programs that enhance educators' digital competencies, ensuring

effective integration of AI-based tools in teaching practice. Student-Centered Digital Pedagogy – More emphasis should be placed on project-based learning, digital collaboration, and creative exploration with AI, allowing students to develop practical competencies. Technological Infrastructure Expansion – Further studies should evaluate the impact of institutional investment in VR, AR, and AI-powered platforms on music learning outcomes. Longitudinal Assessment of Outcomes – Future research should measure the long-term impact of digital literacy training on the career development of music education graduates.

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