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Analysis Factors of Ideological and Political Education in Colleges and Universities in the New Media Era under the Fermatean Neutrosophic Sets

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Abstract: In the era of digital transformation, ideological and political education in colleges and universities has undergone significant changes due to the rapid advancement of new media. Traditional teaching methods are gradually being replaced or supplemented by digital platforms, interactive technologies, and data-driven strategies, enhancing engagement and accessibility. However, this shift also introduces new challenges, including information reliability, digital literacy, and the ethical implications of media influence. This study explores the critical factors influencing ideological and political education in higher education institutions under the new media landscape. This study uses multi-criteria decision making (MCDM) to analysis these factors and select the best alternatives. We use two MCDM methods, such as SIWEC to compute the criteria weights and the MOOSRA method to rank the alternatives. These methods are used under the Fermatean neutrosophic fuzzy sets (FNFSs) to deal with uncertainty and vague information. By analyzing elements such as digital media utilization, student engagement, policy support, and technological infrastructure, this research aims to provide a comprehensive evaluation of the effectiveness and prospects of ideological and political education.

Keywords: Fermatean Neutrosophic Sets; Ideological and Political; Education; New Media Era; Colleges and Universities.

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1. Introduction

The digital revolution has reshaped the educational landscape, transforming the way ideological and political education is delivered in colleges and universities. New media platforms, including social media, online discussion forums, and interactive educational tools, have provided innovative ways to engage students in political and ideological discourse. Unlike conventional classroom lectures, new media enables real-time interaction, diversified content presentation, and personalized learning experiences[1], [2]. These advancements have created an unprecedented opportunity to make ideological and political education more accessible, engaging, and effective for students in higher education. One of the fundamental factors influencing ideological and political education in the new media era is the integration of digital platforms into academic curricula. Universities are increasingly adopting online learning resources, virtual classrooms, and AI-driven content curation to deliver ideological education. These platforms help bridge geographical and logistical barriers, allowing students from different backgrounds to access relevant information. However, the effectiveness of digital media in ideological education depends on its ability to maintain accuracy, credibility, and relevance while combating misinformation and ideological biases[3], [4]. Another critical aspect is student engagement, which plays a pivotal role in the success of ideological education. Traditional passive learning approaches are being replaced by interactive methodologies that promote critical thinking and active participation. Gamification, multimedia content, and social media discussions encourage students to engage with political theories and real-world issues in a more dynamic and relatable manner. However, there are concerns regarding the over-reliance on digital tools, which may reduce in-depth analytical thinking and foster superficial engagement[5], [6]. Technological infrastructure and accessibility also influence the effectiveness of ideological and political education. While advanced universities may have the resources to implement state-of-the-art digital tools, many institutions still face challenges related to inadequate infrastructure, lack of technical expertise, and limited access to high-speed internet. Ensuring equal access to quality digital education resources is essential for maintaining educational equity and inclusivity, particularly for students from disadvantaged backgrounds[7], [8].

Furthermore, the ethical implications of digital media in ideological education cannot be overlooked. The proliferation of user-generated content and algorithm-driven recommendations raises concerns about information manipulation, digital propaganda, and ideological polarization. Universities must establish stringent guidelines to promote media literacy, critical thinking, and ethical content consumption among students. It is crucial to create a balanced environment where diverse perspectives are presented while safeguarding against misinformation and ideological extremism.

Policy and institutional support play a significant role in shaping the effectiveness of ideological and political education in the new media era. Government regulations, university policies, and academic frameworks must align with the evolving digital landscape to ensure that ideological education remains relevant, credible, and impactful. Institutions need to invest in faculty training, technological advancements, and content development to keep up with the dynamic nature of new media and its influence on education[9], [10].

By permitting fuzzy limitations as opposed to strict ones, fuzzy numbers facilitate flexible decision-making. These factors accurately reflect certain circumstances that result in positive outcomes in some areas and negative outcomes in others, ensuring that all goals are consistently met to the highest possible standard. This guarantees equitable use of resources and makes appropriate use of those that are available. The practical use of combining several objectives into a single goal in an aggregated form by creating a single-objective function is one of fuzzy sets' two primary advantages[11], [12].

Further optimization is made possible by fuzzy aggregation operators, such as weighted average or maximum minute, which transform a collection of fuzzy objectives into an aggregate of similarly fuzzy objective functions. This approach guarantees that all goals are included in the final solution and are optimized to the degree that they are important, or to confirm their significance first. Therefore, traditional approaches may handle unknown constraints and coefficients thanks to real-world extensions of linear programming and other forms of mathematical programming, such as fuzzy linear programming and fuzzy multi-objective programming. This enables them to resolve extremely challenging optimization issues that are beyond the scope of conventional mathematical techniques[13], [14].

True membership degree, doubtful membership degree, and false membership degree are examples of neutrophilic sets that further develop this idea. Here, uncertainty refers to the level of ambiguity or ignorance regarding the element's link to belonging or non-belonging, and this supplement greatly broadens the range of situations that may be addressed successfully. Amidst these circumstances, Antony and Jansi presented the Fermatean Neutrosophic Set (FNS), a noteworthy development that relaxes earlier limitations and expands its use in pattern detection and decision-making. The three components of FNS are false, uncertain, and actual membership degrees[15], [16].

2. Proposed Neutrosophic Model

This section presents three parts. In the first part we show the definitions of Fermatean neutrosophic fuzzy (FNF). In the second part we show the steps of the SIWEC method to show the criteria weights. In the third part we show the steps of the MOOSRA method to rank the alternatives.

In the fourth part, some definitions of FNF[17].

Let X be a universal set, we can define the FNF such as

$$Y_{A_i} = \left\{\left(y_{a_i}, T\left(y_{a_i}\right), I\left(y_{a_i}\right), F\left(y_{a_i}\right)\right) y_{a_i} \in X\right\} \tag{1}$$

$T\left(y_{a_i}\right): X \rightarrow [0,1]$ refers to the belongingness degree. (2)

$F\left(y_{a_i}\right): X \rightarrow [0,1]$ refers to the non-belongingness degree. (3)

$I\left(y_{a_i}\right): X \rightarrow [0,1]$ refers to the indeterminacy degree. (4)

$$0 \leq T\left(y_{a_i}\right)^3 + F\left(y_{a_i}\right)^3 \leq 1 \tag{5}$$

$$0 \leq I\left(y_{a_i}\right)^3 \leq 1 \tag{6}$$

$$0 \leq T\left(y_{a_i}\right)^3 + I\left(y_{a_i}\right)^3 + F\left(y_{a_i}\right)^3 \leq 2 \tag{7}$$

Definition 3

Operations of FNF can be defined as:

$$\mathrm{Y}_{A_1}^{c}=\begin{Bmatrix} F(y_{a_1}), \\ \left(1-I(y_{a_1})\right), \\ T(y_{a_1}) \end{Bmatrix} \tag{8}$$

$$\mathrm{Y}_{A_1}\cup\mathrm{Y}_{A_2}=\begin{Bmatrix} \max\left(T(y_{a_1}),T(y_{a_2})\right), \\ \min\left(I(y_{a_1}),I(y_{a_2})\right) \\ \min\left(F(y_{a_1}),F(y_{a_2})\right) \end{Bmatrix} \tag{9}$$

$$\mathrm{Y}_{A_1}\cap\mathrm{Y}_{A_2}=\begin{Bmatrix} \min\left(T(y_{a_1}),T(y_{a_2})\right), \\ \max\left(I(y_{a_1}),I(y_{a_2})\right) \\ \max\left(F(y_{a_1}),F(y_{a_2})\right) \end{Bmatrix} \tag{10}$$

$$\mathrm{Y}_{A_1}\oplus\mathrm{Y}_{A_2}=\begin{Bmatrix} \sqrt[3]{T(y_{a_1})^3+T(y_{a_2})^3-T(y_{a_1})^3T(y_{a_2})^3}, \\ I(y_{a_1})^3I(y_{a_2})^3, \\ F(y_{a_1})^3F(y_{a_2})^3 \end{Bmatrix} \tag{11}$$

$$\mathrm{Y}_{A_1}\otimes\mathrm{Y}_{A_2}=\begin{Bmatrix} T(y_{a_1})^3T(y_{a_2})^3, \\ \sqrt[3]{I(y_{a_1})^3+I(y_{a_2})^3-I(y_{a_1})^3I(y_{a_2})^3}, \\ \sqrt[3]{F(y_{a_1})^3+F(y_{a_2})^3-F(y_{a_1})^3F(y_{a_2})^3} \end{Bmatrix} \tag{12}$$

Definition 2

The score function can be defined as:

$$(\mathrm{Y}_{A_1})=T(y_{a_1})^3\left(1+I(y_{a_1})^3\left(1-T(y_{a_1})^3-F(y_{a_1})^3\right)\right) \tag{13}$$

In the second part, we show the steps of the SIWEC method[18].

Create the decision matrix.

Determine the normalization of the decision matrix

$$q_{ij}=\frac{y_{ij}}{\max y_{ij}} \tag{14}$$

Determine the standard deviation

Multiply the standard deviation by the q_{ij}values.

$$k_{ij}=q_{ij}\times \mathrm{std}_{\mathrm{j}} \tag{15}$$

Determine the sum of each row

$$u_j = \sum_{j=1}^{n} j_{ij} \tag{16}$$

Determine the criteria weights.

$$W_j = \frac{u_j}{\sum_{j=1}^{n} u_{ij}} \tag{17}$$

In the third part, we show the steps of the MOOSRA method.

Determine the normalized decision matrix.

$$g_{ij} = \frac{y_{ij}}{\sqrt{\sum_{i=1}^{m} y_{ij}^2}} \tag{18}$$

Determine the weighted decision matrix.

$$r_{ij} = w_j g_{ij} \tag{19}$$

Determine the MOOSRA value

$$D_{ij} = \frac{\sum_{j=1}^{g} r_{ij}}{\sum_{g+1}^{n} r_{ij}} \tag{20}$$

Rank the alternatives.

3. Case Study

In this section, we show the case study for Analysis of Ideological and Political Education in Colleges and Universities in the New Media Era. This study collects eight criteria and seven alternatives such as Curriculum Integration, Ethical and Moral Influence, Student Engagement, Teaching Innovation, Policy and Institutional Support, Information Accuracy and Credibility, Technological Infrastructure and Accessibility, Digital Media Utilization. The alternatives of this study are: Interactive Online Courses, University Media Centers and Podcasts, Influencer and Peer-Led Education Initiatives, Gamification of Education, Artificial Intelligence-Based Personalized Learning, Virtual Reality and Augmented Reality Applications, Social Media-Based Learning.

Four experts are used the FNF numbers to evaluate the criteria and alternative to create the decision matrix as shown in Table 1.

Eq. (14) is used to determine the normalization of the decision matrix as shown in Table 2.

Then we determine the standard deviation

Eq. (15) is used to multiply the standard deviation by the q_{ij} values as shown in Table 3.

Then we determine the sum of each row using Eq. (16).

Then we determine the criteria weights using Eq. (17) as shown in Fig 1.

Table 1. The decision matrix.

	IPEC$_1$	IPEC$_2$	IPEC$_3$	IPEC$_4$	IPEC$_5$	IPEC$_6$	IPEC$_7$	IPEC$_8$
IPEA$_1$	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.2,0.8,0.75)	(0.8,0.2,0.25)	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.8,0.2,0.25)	(0.2,0.8,0.75)
IPEA$_2$	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.1,0.9,0.85)	(0.8,0.2,0.25)
IPEA$_3$	(0.8,0.2,0.25)	(0.2,0.8,0.75)	(0.8,0.2,0.25)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.2,0.8,0.75)	(0.2,0.8,0.75)	(0.3,0.7,0.65)
IPEA$_4$	(0.2,0.8,0.75)	(0.2,0.8,0.75)	(0.2,0.8,0.75)	(0.6,0.4,0.45)	(0.3,0.7,0.65)	(0.2,0.8,0.75)	(0.6,0.4,0.45)	(0.6,0.4,0.45)
IPEA$_5$	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.1,0.9,0.85)
IPEA$_6$	(0.8,0.2,0.25)	(0.8,0.2,0.25)	(0.8,0.2,0.25)	(0.2,0.8,0.75)	(0.1,0.9,0.85)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.2,0.8,0.75)
IPEA$_7$	(0.1,0.9,0.85)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.2,0.8,0.75)	(0.8,0.2,0.25)
	IPEC$_1$	IPEC$_2$	IPEC$_3$	IPEC$_4$	IPEC$_5$	IPEC$_6$	IPEC$_7$	IPEC$_8$
IPEA$_1$	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.3,0.7,0.65)
IPEA$_2$	(0.8,0.2,0.25)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.1,0.9,0.85)	(0.4,0.6,0.55)
IPEA$_3$	(0.7,0.3,0.3.5)	(0.1,0.9,0.85)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.2,0.8,0.75)	(0.8,0.2,0.25)	(0.6,0.4,0.45)
IPEA$_4$	(0.6,0.4,0.45)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.1,0.9,0.85)	(0.7,0.3,0.3.5)	(0.7,0.3,0.3.5)
IPEA$_5$	(0.4,0.6,0.55)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.6,0.4,0.45)	(0.8,0.2,0.25)
IPEA$_6$	(0.3,0.7,0.65)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.4,0.6,0.55)	(0.7,0.3,0.3.5)
IPEA$_7$	(0.2,0.8,0.75)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.3,0.7,0.65)	(0.6,0.4,0.45)
	IPEC$_1$	IPEC$_2$	IPEC$_3$	IPEC$_4$	IPEC$_5$	IPEC$_6$	IPEC$_7$	IPEC$_8$
IPEA$_1$	(0.4,0.6,0.55)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.3,0.7,0.65)
IPEA$_2$	(0.3,0.7,0.65)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)	(0.4,0.6,0.55)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.4,0.6,0.55)
IPEA$_3$	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.6,0.4,0.45)
IPEA$_4$	(0.1,0.9,0.85)	(0.3,0.7,0.65)	(0.2,0.8,0.75)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.7,0.3,0.3.5)

IPEA5	(0.8,0.2,0.25)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.6,0.4,0.45)
IPEA6	(0.4,0.6,0.55)	(0.4,0.6,0.55)	(0.4,0.6,0.55)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.4,0.6,0.55)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)
IPEA7	(0.3,0.7,0.65)	(0.3,0.7,0.65)	(0.3,0.7,0.65)	(0.7,0.3,0.3.5)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)
	IPEC1	IPEC2	IPEC3	IPEC4	IPEC5	IPEC6	IPEC7	IPEC8
IPEA1	(0.1,0.9,0.85)	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.8,0.2,0.25)	(0.3,0.7,0.65)
IPEA2	(0.1,0.9,0.85)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.1,0.9,0.85)	(0.4,0.6,0.55)
IPEA3	(0.2,0.8,0.75)	(0.3,0.7,0.65)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.2,0.8,0.75)	(0.2,0.8,0.75)	(0.6,0.4,0.45)
IPEA4	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.2,0.8,0.75)	(0.1,0.9,0.85)	(0.8,0.2,0.25)	(0.1,0.9,0.85)	(0.3,0.7,0.65)	(0.7,0.3,0.3.5)
IPEA5	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.3,0.7,0.65)	(0.2,0.8,0.75)	(0.1,0.9,0.85)	(0.8,0.2,0.25)	(0.4,0.6,0.55)	(0.8,0.2,0.25)
IPEA6	(0.6,0.4,0.45)	(0.6,0.4,0.45)	(0.4,0.6,0.55)	(0.6,0.4,0.45)	(0.8,0.2,0.25)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)
IPEA7	(0.7,0.3,0.3.5)	(0.7,0.3,0.3.5)	(0.3,0.7,0.65)	(0.7,0.3,0.3.5)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)	(0.7,0.3,0.3.5)	(0.6,0.4,0.45)

Table 2. Normalized decision matrix.

	IPEC1	IPEC2	IPEC3	IPEC4	IPEC5	IPEC6	IPEC7	IPEC8
IPEA1	0.400791	0.35315	0.105733	0.580237	1	0.77226	1	0.087083
IPEA2	1	1	1	0.414485	0.33088	0.092248	0.038177	0.580237
IPEA3	0.831242	0.050905	0.7045	0.389229	0.892685	0.028487	0.276335	0.558493
IPEA4	0.293458	0.383132	0.030827	0.187533	0.645176	0.009769	0.300655	1
IPEA5	0.767381	0.323538	0.555836	0.011149	0.593902	0.710056	0.151689	0.986701
IPEA6	0.797672	0.6738	0.96616	0.993821	0.95885	1	0.396662	0.830736
IPEA7	0.370567	0.317715	0.350557	1	0.801877	0.574224	0.360541	0.936326

Table 3. The multiplication values of standard deviation by the q_{ij}.

	IPEC1	IPEC2	IPEC3	IPEC4	IPEC5	IPEC6	IPEC7	IPEC8
IPEA1	0.110626	0.107781	0.041032	0.219119	0.238077	0.313484	0.307795	0.028756
IPEA2	0.276018	0.305199	0.388078	0.156525	0.078775	0.037446	0.011751	0.191605
IPEA3	0.229438	0.015536	0.273401	0.146987	0.212528	0.011564	0.085055	0.184425
IPEA4	0.081	0.116932	0.011963	0.070819	0.153602	0.003966	0.09254	0.330219
IPEA5	0.211811	0.098744	0.215708	0.00421	0.141394	0.288234	0.046689	0.325828
IPEA6	0.220172	0.205643	0.374946	0.375303	0.22828	0.405931	0.122091	0.274325

IPEA$_7$	0.102283	0.096967	0.136043	0.377637	0.190908	0.233095	0.110973	0.309193

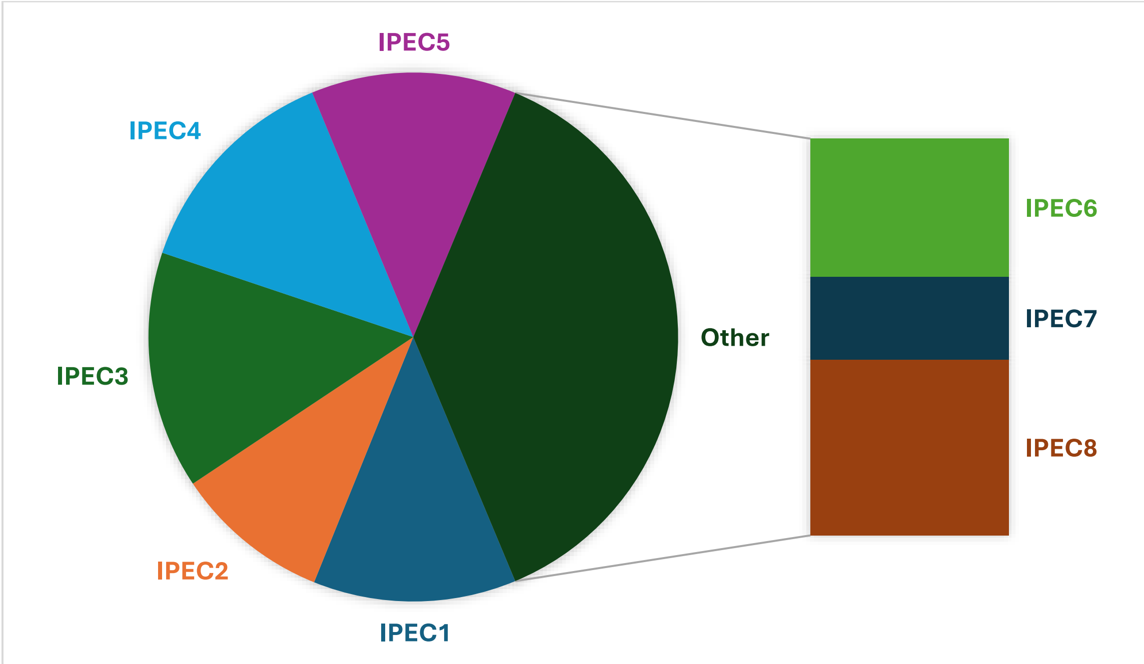

Fig 1. The criteria weights.

In the third part, we show the steps of the MOOSRA method.

Eq. (18) is used to determine the normalized decision matrix as shown in Table 4.

Eq. (19) is used to determine the weighted decision matrix as shown in Table 5.

Eq. (20) is used to determine the MOOSRA value as shown in Table 6.

Then we rank the alternatives as shown in Fig 2.

Table 4. The normalized values by the MOOSRA method.

	IPEC$_1$	IPEC$_2$	IPEC$_3$	IPEC$_4$	IPEC$_5$	IPEC$_6$	IPEC$_7$	IPEC$_8$
IPEA$_1$	0.220622	0.253958	0.062371	0.354241	0.485772	0.494418	0.822397	0.042509
IPEA$_2$	0.550466	0.719123	0.589895	0.253048	0.160732	0.059059	0.031396	0.283242
IPEA$_3$	0.457571	0.036607	0.415581	0.237629	0.433642	0.018238	0.227257	0.272628
IPEA$_4$	0.161539	0.275519	0.018185	0.114491	0.313409	0.006254	0.247258	0.488149
IPEA$_5$	0.422417	0.232663	0.327885	0.006806	0.288501	0.454593	0.124749	0.481657
IPEA$_6$	0.439091	0.484545	0.569933	0.60674	0.465783	0.640222	0.326214	0.405523
IPEA$_7$	0.203984	0.228476	0.206792	0.610512	0.38953	0.367631	0.296508	0.457066

Table 5. The weighted decision matrix.

	IPEC1	IPEC2	IPEC3	IPEC4	IPEC5	IPEC6	IPEC7	IPEC8
IPEA1	0.027362	0.024218	0.009054	0.048189	0.060844	0.064425	0.064352	0.00704
IPEA2	0.06827	0.068577	0.085627	0.034423	0.020132	0.007696	0.002457	0.046911
IPEA3	0.056749	0.003491	0.060324	0.032325	0.054315	0.002377	0.017783	0.045153
IPEA4	0.020034	0.026274	0.00264	0.015575	0.039255	0.000815	0.019348	0.080847
IPEA5	0.052389	0.022187	0.047594	0.000926	0.036136	0.059235	0.009761	0.079772
IPEA6	0.054457	0.046207	0.082729	0.082537	0.058341	0.083424	0.025526	0.067163
IPEA7	0.025299	0.021788	0.030017	0.08305	0.04879	0.047904	0.023201	0.075699

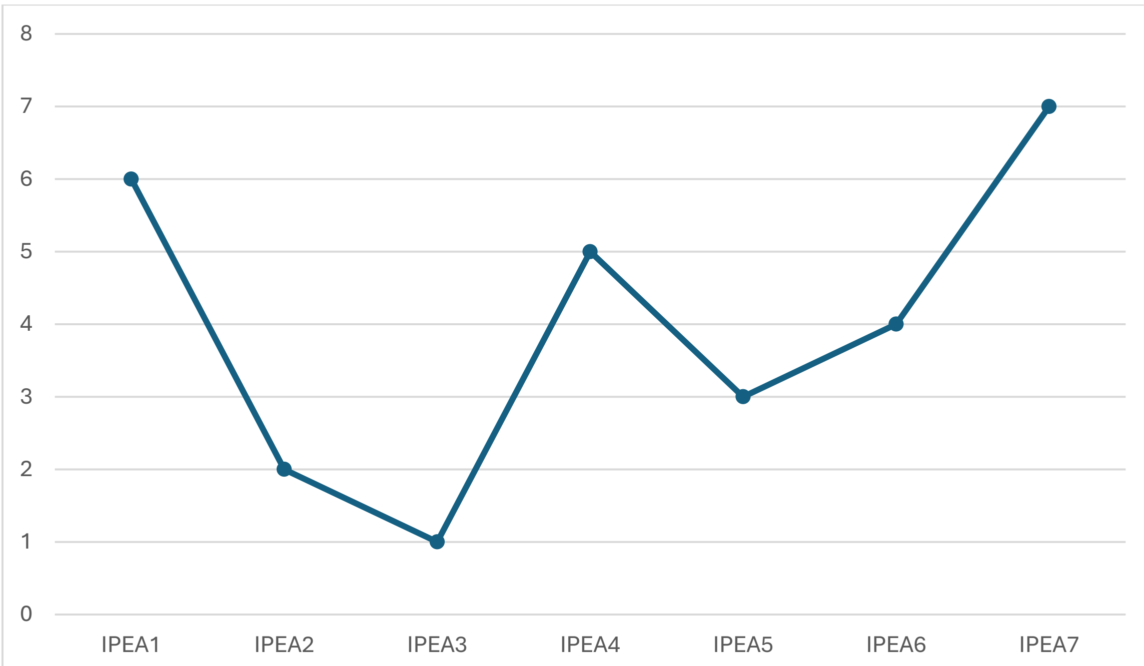

Fig 2. The rank of alternatives.

4. Discussion and Analysis

Sensitivity analysis in Multi-Criteria Decision-Making (MCDM) is an essential tool for evaluating the robustness of decisions when multiple conflicting criteria are involved. Since MCDM methods often rely on weighted criteria to rank alternatives, minor variations in these weights can significantly alter the final decision. Sensitivity analysis helps decision-makers understand how stable their rankings are by systematically adjusting input values and observing the impact on the results. This is particularly useful in complex decision environments where data uncertainty, expert judgment, or subjective preferences may introduce variability. By applying sensitivity analysis, decision-makers can ensure that small fluctuations in criteria weights do not lead to drastic or unrealistic changes in rankings, reinforcing the credibility of the decision-making process.

Furthermore, sensitivity analysis in MCDM enhances the adaptability of models by identifying critical factors that influence final rankings the most. It allows decision-makers to determine which criteria have a dominant effect and which ones contribute marginally, helping in refining weight distributions for a more balanced evaluation. For example, in supplier selection, if altering the weight of "cost-effectiveness" significantly changes the ranking, it signals the need for careful prioritization of financial considerations. Similarly, in environmental impact assessments, sensitivity analysis can highlight whether sustainability-related criteria are given appropriate importance. By incorporating sensitivity analysis, MCDM frameworks become more reliable, transparent, and responsive to real-world uncertainties, ultimately leading to more informed and justifiable decision-making

In this study, we conducted sensitivity analysis to change the criteria weights by nine cases, then we ranked the alternatives to show the stability of the ranks. We change the criteria weights by nine cases as shown in Fig 3. Then we apply the steps of the MOOSRA method. We obtained the normalization values, then we obtained the weighted decision matrix. Then we show the score value in each alternative as shown in Fig 4. Then we rank the alternatives as shown in Fig 5. The results show the ranks of the alternatives are stable under different cases.

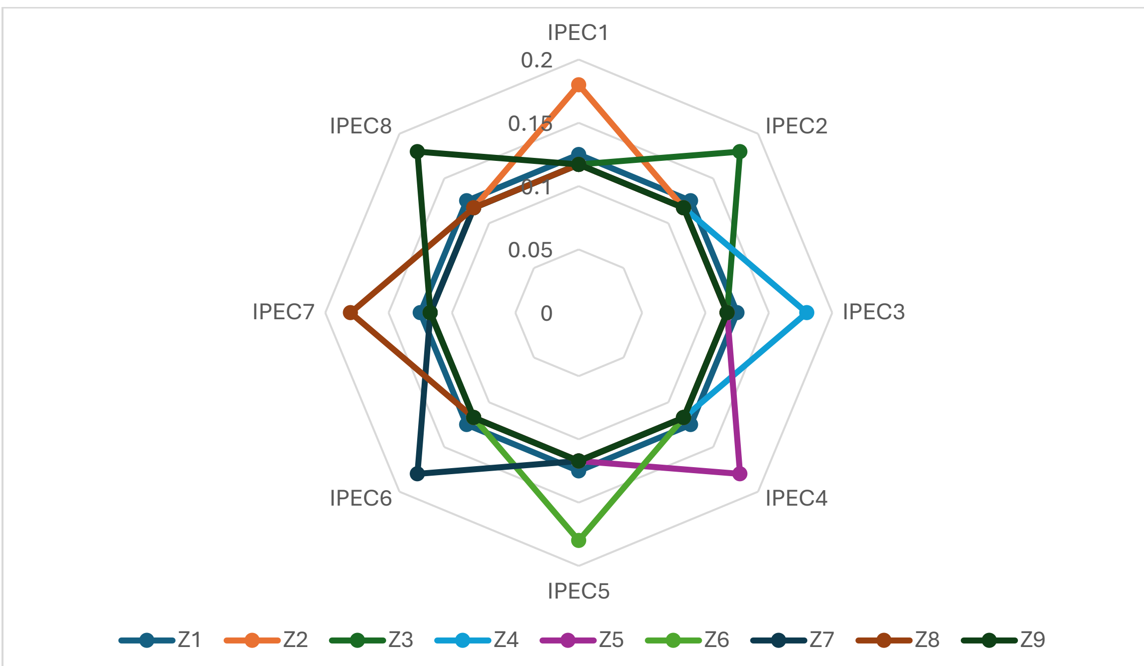

Fig 3. Different criteria weights.

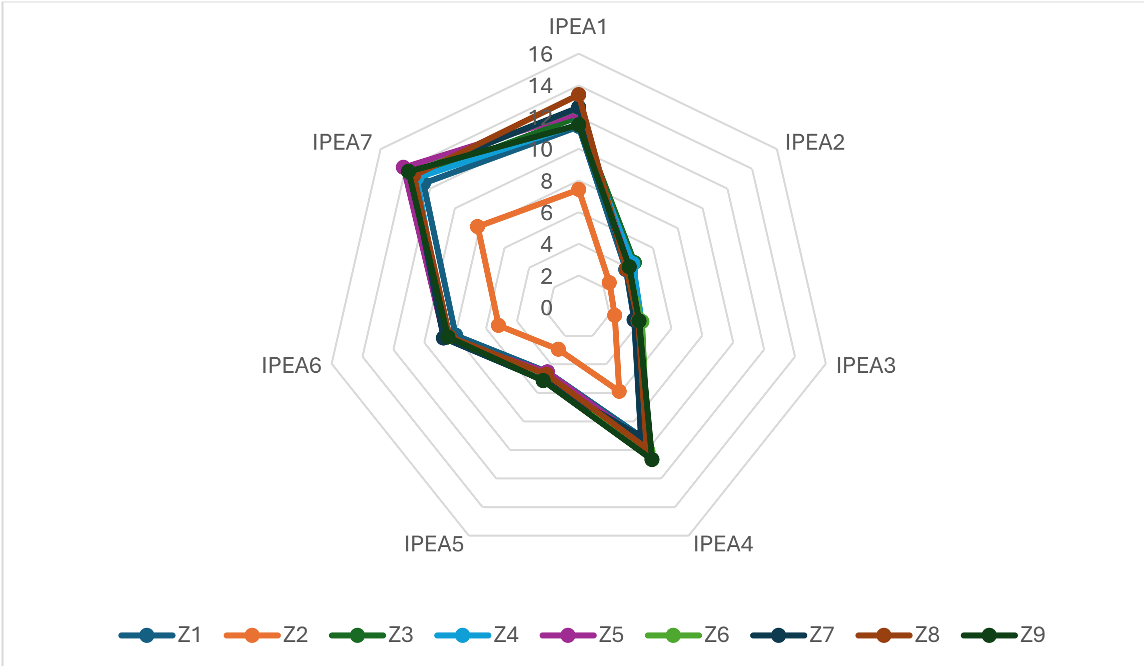

Fig 4. The MOODRA value of each alternative.

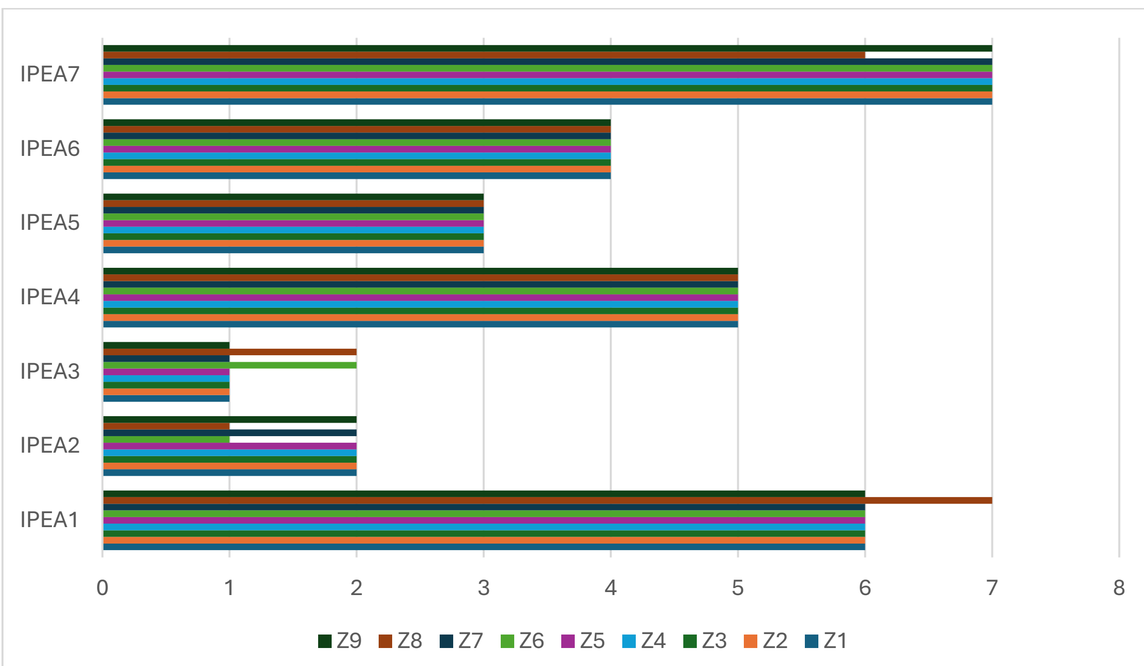

Fig 5. The rank of alternatives under different cases.

5. Conclusions

As higher education adapts to the digital era, ideological and political education in colleges and universities must evolve to remain effective and impactful. While new media offers vast opportunities for engagement, accessibility, and interactivity, it also presents challenges related to misinformation, ethical concerns, and disparities in technological access. A well-balanced approach that combines traditional teaching methods with digital innovation is essential to ensure the credibility, inclusivity, and effectiveness of ideological and political education. Two MCDM methods are used in this study such as SIWEC methodology to show the criteria weights and the MOOSRA methodology to rank the alternatives. These methods are used under the Fermatean neutrosophic fuzzy to deal with uncertainty and vague data. We used eight criteria and seven alternatives. The results of the sensitivity analysis show the ranks of the alternative are stable under different criteria weights.

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