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Research on the Effect Evaluation of Counselors' Heart-to-Heart Talks Based on the AHP-BP Neural Network

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Abstract

Counselors' heart-to-heart talks constitute the core carrier for colleges and universities to fulfill the fundamental task of fostering virtue through education, and the scientific rigor of their effect evaluation directly underpins the precision and effectiveness of ideological and political education. Aiming at the inherent limitations of traditional evaluation methods—such as excessive subjectivity and inadequate nonlinear fitting capacity—this study integrates the Analytic Hierarchy Process (AHP) with the Back Propagation (BP) neural network to develop a comprehensive evaluation model. An empirical investigation was conducted based on a large sample of 3,484 student experience feedback questionnaires and 600 counselor self-assessment questionnaires. The empirical results demonstrate that the AHP-BP model achieves an evaluation accuracy of 92.3%, which is significantly superior to the single AHP model (78.6%) and the fuzzy comprehensive evaluation model (83.1%). This research not only provides a scientific quantitative tool for the accurate evaluation of counselors' heart-to-heart talk effectiveness but also offers empirical data support and practical implementation paths for enhancing the quality of ideological and political education in higher education institutions.

Keywords

Counselors' heart-to-heart talks; Effect evaluation; AHP-BP neural network.

1. Introduction

Counselors' heart-to-heart talks are the "lifeline" of ideological and political education in colleges and universities and a key part in constructing the pattern of "whole-person, whole-process and all-round education" [1]. With the development of higher education into the stage of high-quality development, students' ideological concepts and value orientations present diversified characteristics, putting forward higher requirements for the pertinence and effectiveness of counselors' heart-to-heart talks. At present, research on counselors' heart-to-heart talks mainly focuses on three directions: first, the educational value and method innovation of heart-to-heart talks, which emphasizes student-centered communication skills, such as introducing solution-focused brief therapy technology to improve the pertinence of heart-to-heart talks [2], constructing a dialogical heart-to-heart talk model based on the view of communicative practice [3], and optimizing the strategies of heart-to-heart talks by applying positive psychology theories [4]; second, the construction of mechanisms for heart-to-heart talks, which explores the path to establish a long-term mechanism [5], the role orientation and responsibility boundary of counselors from the perspective of "whole-person, whole-process

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and all-round education" [1], and the intelligent transformation of heart-to-heart talks under the background of big data [6]; third, research on effect evaluation, which mostly adopts single models such as fuzzy comprehensive evaluation [3] and analytic hierarchy process [7], with problems such as insufficient quantitative accuracy and incomplete index system.

The Analytic Hierarchy Process (AHP) can scientifically assign index weights through expert consultation and clarify the relative importance of each element, but it cannot handle complex nonlinear relationships; the BP neural network has strong nonlinear mapping ability and can explore the potential laws in data, yet it lacks clear weight interpretability [8]. The organic integration of the two methods not only retains the weight interpretability of AHP but also gives play to the nonlinear fitting advantage of the BP neural network, which can provide a new technical path for the effect evaluation of counselors' heart-to-heart talks. Taking the effect of counselors' heart-to-heart talks as the research object, this paper constructs a dual-perspective evaluation index system including counselor self-evaluation and student experience, integrates AHP and BP neural network to build a comprehensive evaluation model, and conducts a large-sample empirical study. The research aims to provide a theoretical basis and practical tools for improving the effectiveness of ideological and political education in colleges and universities, and also to fill the research gap of insufficient precision in the quantitative evaluation of the effect of counselors' heart-to-heart talks.

This study has three main innovations: first, constructing a dual-perspective evaluation index system that takes into account the process indicators of counselor self-evaluation and the experience indicators of student evaluation, fully reflecting the process and effect of heart-to-heart talks; second, integrating the advantages of AHP and BP neural network to solve the limitations of single models and improve the scientificity and accuracy of evaluation; third, conducting an empirical study based on large-sample data to verify the effectiveness and universality of the model, and providing a promotable technical tool for the effect evaluation of counselors' heart-to-heart talks.

2. Research Methodology and Model Construction

2.1. Construction of the Evaluation Index System

Based on the "Context-Input-Process-Product (CIPP)" model framework, combined with the core dimensions of Questionnaire for Evaluating the Effect of Counselors' Heart-to-Heart Talks (Counselor Version) and Experience Feedback Questionnaire on Counselors' Heart-to-Heart Talks (Student Version), a dual-perspective evaluation system for the effect of counselors' heart-to-heart talks was constructed, which includes 4 first-level indicators, 12 second-level indicators and 36 third-level indicators (Table 1). The first-level indicators cover the whole process of heart-to-heart talks from preparation to guarantee; the second-level indicators refine the core elements of each link of the first-level indicators; the third-level indicators focus on the specific evaluation content of the second-level indicators. At the same time, the evaluation perspective (counselor self-evaluation, student evaluation, dual perspective) of each indicator is clearly defined to ensure the comprehensiveness and objectivity of the evaluation.

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Table 1. Evaluation Index System for the Effect of Counselors' Heart-to-Heart Talks

First-level Index	Second-level Index	Third-level Index	Evaluation Perspective
Background Quality (A_1)	Talk Preparation (B_1)	Understanding of Students' Situation Before the Talk (C_1)	Counselor Self-evaluation
		Clarification of Talk Objectives (C_2)	Counselor Self-evaluation
		Preparation of Talk Plan (C_3)	Counselor Self-evaluation
	Matching Degree (B_2)	Matching Degree of Talk Participants (C_4)	Dual Perspectives
		Appropriateness of Talk Timing (C_5)	Dual Perspectives
		Suitability of Talk Venue (C_6)	Student Evaluation
Process Quality (A_2)	Communication Skills (B_3)	Listening Ability (C_7)	Student Evaluation
		Clarity of Expression (C_8)	Student Evaluation
		Timeliness of Emotional Response (C_9)	Student Evaluation
	Interaction Effect (B_4)	Student Participation (C_{10})	Dual Perspectives
		Depth of Problem Discussion (C_{11})	Dual Perspectives
		Degree of Privacy Protection (C_{12})	Student Evaluation
	Duration Control (B_5)	Appropriateness of Talk Duration (C_{13})	Dual Perspectives
		Rationality of Rhythm Control (C_{14})	Counselor Self-evaluation
		Emphasis on Key Points (C_{15})	Counselor Self-evaluation
Outcome Quality (A_3)	Problem Solving (B_6)	Degree of Trouble Resolution (C_{16})	Student Evaluation
		Effect of Cognitive Improvement (C_{17})	Student Evaluation
		Role in Promoting Action (C_{18})	Student Evaluation
	Relationship Improvement (B_7)	Enhancement of Teacher-Student Trust (C_{19})	Dual Perspectives
		Student Satisfaction (C_{20})	Student Evaluation
		Willingness to Accept Talks Again (C_{21})	Student Evaluation
	Long-term Impact (B_8)	Effect of Values Guidance (C_{22})	Dual Perspectives
		Promotion of Mental Health (C_{23})	Student Evaluation
		Improvement of Comprehensive Quality (C_{24})	Counselor Self-evaluation
Support Quality (A_4)	Institutional Support (B_9)	Perfection of Heart-to-Heart Talk System (C_{25})	Counselor Self-evaluation
		Soundness of Training System (C_{26})	Counselor Self-evaluation
		Rationality of Assessment Mechanism (C_{27})	Counselor Self-evaluation
	Resource Allocation (B_{10})	Adequacy of Time Guarantee (C_{28})	Counselor Self-evaluation
		Completeness of Venue Resources (C_{29})	Dual Perspectives
		Technical Tool Support (C_{30})	Counselor Self-evaluation
	Feedback and Improvement (B_{11})	Smoothness of Feedback Channels (C_{31})	Dual Perspectives
		Timeliness of Problem Rectification (C_{32})	Counselor Self-evaluation
		Effectiveness of Experience Summary (C_{33})	Counselor Self-evaluation

2.2. Determining Index Weights by Analytic Hierarchy Process (AHP)

2.2.1. Construction of the Judgment Matrix

Fifteen experts in ideological and political education and senior college counselors were invited to construct judgment matrices for first-level, second-level and third-level indicators by using the 1-9 scaling method. The relative importance of each indicator was determined through pairwise comparison. Taking the criterion layer (first-level indicators) as an example, the judgment matrix:

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$$A=\begin{bmatrix} 1 & a_{12} & a_{13} & a_{14} \\ a_{21} & 1 & a_{23} & a_{24} \\ a_{31} & a_{32} & 1 & a_{34} \\ a_{41} & a_{42} & a_{43} & 1 \end{bmatrix}$$

Where aij represents the importance degree of the i-th first-level indicator relative to the j-th first-level indicator, $a_{ij} > 0$ and aji=1/aij. A scale value of 1 indicates that the two indicators are equally important, a scale value of 9 indicates that one indicator is extremely more important than the other, and the other scale values are the quantitative expressions of intermediate importance degrees. The judgment matrices for the second-level and third-level indicators were constructed in the same way, laying a foundation for the subsequent weight calculation.

2.2.2. Weight Calculation and Consistency Test

The eigenvalue method was adopted to calculate the index weights. The specific steps are as follows: first, calculate the maximum eigenvalue λmax of the judgment matrix and the corresponding eigenvector.

The consistency test was used to judge the rationality of the judgment matrix, so as to avoid the logical inconsistency of the expert's judgment results. The consistency index CI and the random consistency ratio CR were calculated according to the following formulas:

$$CI=\frac{\lambda_{\max}-n}{n-1}$$

$$CR=\frac{CI}{RI}$$

Where n is the order of the judgment matrix, and RI is the random consistency index (Table 2). When CR<0.1, the judgment matrix is considered to have satisfactory consistency; otherwise, the scale values of the elements in the judgment matrix need to be adjusted, and the judgment matrix should be reconstructed until the consistency requirement is met.

Table 2. Values of the Random Consistency Index (RI)

Order of matrix n	1	2	3	4	5	6	7	8	9
Random consistency index RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45

2.2.3. Construction of the BP Neural Network Model

Although AHP can scientifically determine the weights of each evaluation index and clarify the relative importance among indicators, it is difficult to capture the complex nonlinear mapping relationship between indicators and the effect of heart-to-heart talks, however,he BP neural network has strong nonlinear fitting and autonomous learning abilities, which can effectively make up for this defect [8]. Therefore, on the basis of determining the index weights by AHP, this study constructs a BP neural network model, taking the AHP weights as the initial input weights of the neural network to realize the advantage integration of the two methods, thereby improving the accuracy and scientificity of the effect evaluation of heart-to-heart talks.

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(1) Network Structure Design

The BP neural network adopts a three-layer structure (input layer, hidden layer, output layer) in this study, and the number of neurons in each layer is determined as follows:

Input layer: It contains 36 neurons, which correspond to the 36 third-level indicators of the evaluation index system one by one, and the input value is the normalized score of each third-level indicator.

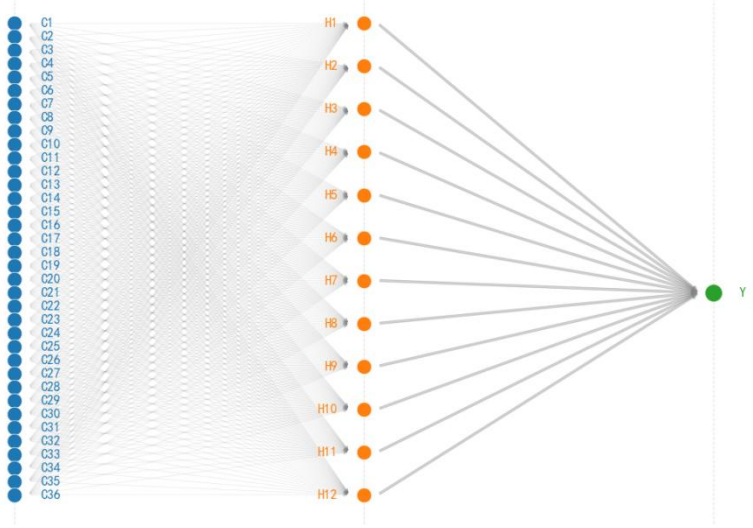
Hidden layer: The number of neurons is determined by the empirical formula:

$$l = \sqrt{m+n}+a$$

Where m is the number of neurons in the input layer, n is the number of neurons in the output layer, and a is a constant ranging from 0 to 10. In this paper, a=5, so the number of neurons in the hidden layer l=12.

Output layer: It contains 1 neuron, which corresponds to the comprehensive score of the effect of counselors' heart-to-heart talks (score range: 0-100 points).

(2) BP Neural Network Structure for Evaluating the Effect of College Counselors' Heart-to-Heart Talks



Input Layer (36 Input Indicators) Hidden Layer (12 Features) Output Layer (Evaluation Result)

Figure 1. Schematic Diagram of BP Neural Network Structure

(3) Data Preprocessing and Model Training

Normalize the original data of the 36 third-level indicators normalize and map them to the interval [0, 1] by using the min-max normalization method:

$$x' = \frac{x - x_{\min}}{x_{\max} - x_{\min}}$$

Where x is the original score of the indicator, xmax and xmin are the maximum and minimum values of the indicator in the sample data, the normalized data set was divided into a training set, a validation set and a test set at a ratio of 7:2:1. The gradient descent method was used to train the model, and the Sigmoid function was selected as the activation function of the hidden layer and output layer:

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$$f(x) = \frac{1}{1+e^{-x}}$$

The mean square error (MSE) was adopted as the loss function of the model to measure the difference between the predicted value and the actual value:

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$$

Where yi is the actual comprehensive score of the i-th sample, y^i is the predicted comprehensive score of the i-th sample, and N is the number of samples in the data set. The training parameters of the model were set as follows: the number of training iterations was 1000, the learning rate was 0.01, and the momentum factor was 0.9.

(4) Fusion of the AHP-BP Model

The indicator weights calculated by AHP are used as the initial weights of the input layer of the BP neural network, and the weights are adjusted through training, integrating the weight interpretability of AHP and the nonlinear fitting ability of the BP neural network. The specific steps are as follows: ① Calculate each indicator weight W using AHP; ② Take W as the initial weight of the input layer of the BP neural network; ③ Train the BP neural network with training set data; ④ Evaluate the model performance with test set data.

2.2.4. Research Design and Data Sources

In this paper, a stratified random sampling method was adopted to select counselors and students from 127 colleges and universities across the country as survey respondents. Data were collected through online questionnaires, and 4,144 valid questionnaires were recovered (including 600 counselor questionnaires and 3,484 student questionnaires). The survey covered four dimensions of counselor one-on-one talks: background quality, process quality, outcome quality, and support quality. A 5-point Likert scale was used for scoring (1 to 5 points, representing "strongly dissatisfied" to "strongly satisfied", respectively). SPSS 26.0 was used for descriptive statistics and correlation analysis, and Python 3.8 was used to construct and train the AHP-BP fusion model.

3. Results and Analysis

Based on the constructed dual-perspective evaluation index system and the AHP-BP fusion model, an empirical analysis was conducted on the collected questionnaire data. This involved calculating the weights of indicators, training the neural network model, evaluating the comprehensive effect, analyzing group differences, and analyzing the importance of indicators. The system verified the effectiveness and scientificity of the model, and explored the key influencing factors and regular characteristics of the effectiveness of counselors' heart-to-heart talks.

3.1. AHP Weight Calculation Results

The weights of indicators at each level were calculated using the Analytic Hierarchy Process (AHP) (Table 3). The results indicate that process quality (A_2) contributes the most to the effectiveness of heart-to-heart talks (weight 0.327), followed by outcome quality (A_3, 0.289), background quality (A_1, 0.201), and support quality (A_4, 0.183). Among the secondary indicators, communication skills (B_3, 0.124), problem-solving (B_6, 0.117), and interactive effect (B_4, 0.109) have higher weights, reflecting that these aspects are the core elements affecting the effectiveness of heart-to-heart talks. Among the tertiary indicators, listening ability (C_7, 0.059),

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understanding students' situations before talks (C_1, 0.057), and degree of problem resolution (C_{16}, 0.053) are the three indicators with the highest weights, providing a clear direction for counselors to optimize their heart-to-heart talk strategies.

Table 3. Weights of Indicators at All Levels of the Evaluation Index System

First-level Indicators	Weight	Second-level Indicators	Weight	Third-level Indicators	Weight
Background Quality (A_1)	0.201	Talk Preparation (B_1)	0.103	Understanding of Students Before the Talk (C_1)	0.057
				Clarification of Talk Objectives (C_2)	0.032
				Preparation of Talk Plan (C_3)	0.014
		Matching Degree (B_2)	0.098	Matching Degree with Talk Subjects (C_4)	0.045
				Appropriateness of Talk Timing (C_5)	0.038
				Suitability of Talk Venue (C_6)	0.015
Process Quality (A_2)	0.327	Communication Skills (B_3)	0.124	Listening Ability (C_7)	0.059
				Clarity of Expression (C_8)	0.042
				Timeliness of Emotional Response (C_9)	0.023
		Interaction Effect (B_4)	0.109	Student Participation (C_{10})	0.048
				Depth of Problem Discussion (C_{11})	0.037
				Degree of Privacy Protection (C_{12})	0.024
		Duration Control (B_5)	0.094	Appropriateness of Talk Duration (C_{13})	0.041
				Rationality of Rhythm Control (C_{14})	0.033
				Emphasis on Key Points (C_{15})	0.020
Outcome Quality (A_3)	0.289	Problem Solving (B_6)	0.117	Degree of Trouble Resolution (C_{16})	0.053
				Effect of Cognitive Improvement (C_{17})	0.039
				Role in Promoting Action (C_{18})	0.025
		Relationship Improvement (B_7)	0.092	Enhancement of Teacher-Student Trust (C_{19})	0.042
				Student Satisfaction (C_{20})	0.035
				Willingness to Accept Again (C_{21})	0.015
		Long-term Impact (B_8)	0.080	Effect of Values Guidance (C_{22})	0.036
				Promotion of Mental Health (C_{23})	0.029
				Improvement of Comprehensive Quality (C_{24})	0.015
Support Quality (A_4)	0.183	Institutional Support (B_9)	0.078	Perfection of Talk System (C_{25})	0.035
				Soundness of Training System (C_{26})	0.028
				Rationality of Assessment Mechanism (C_{27})	0.015
		Resource Allocation (B_{10})	0.062	Adequacy of Time Support (C_{28})	0.028
				Completeness of Venue Resources (C_{29})	0.022
				Technical Tool Support (C_{30})	0.012
		Feedback and Improvement (B_{11})	0.043	Smoothness of Feedback Channels (C_{31})	0.019
				Timeliness of Problem Rectification (C_{32})	0.016
				Effectiveness of Experience Summary (C_{33})	0.008

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3.2. BP Neural Network Training Results

Based on the weights of indicators at each level determined through AHP, this study uses the weights of 36 tertiary indicators as the initial parameters of the input layer to train and validate the constructed three-layer BP neural network. The fitting effect of the model is verified by analyzing the training error convergence curve. The performance of the AHP-BP fusion model is compared with that of the single AHP model and fuzzy comprehensive evaluation model in terms of accuracy, precision, recall rate, and other dimensions, comprehensively testing the evaluation advantages of the fusion model.

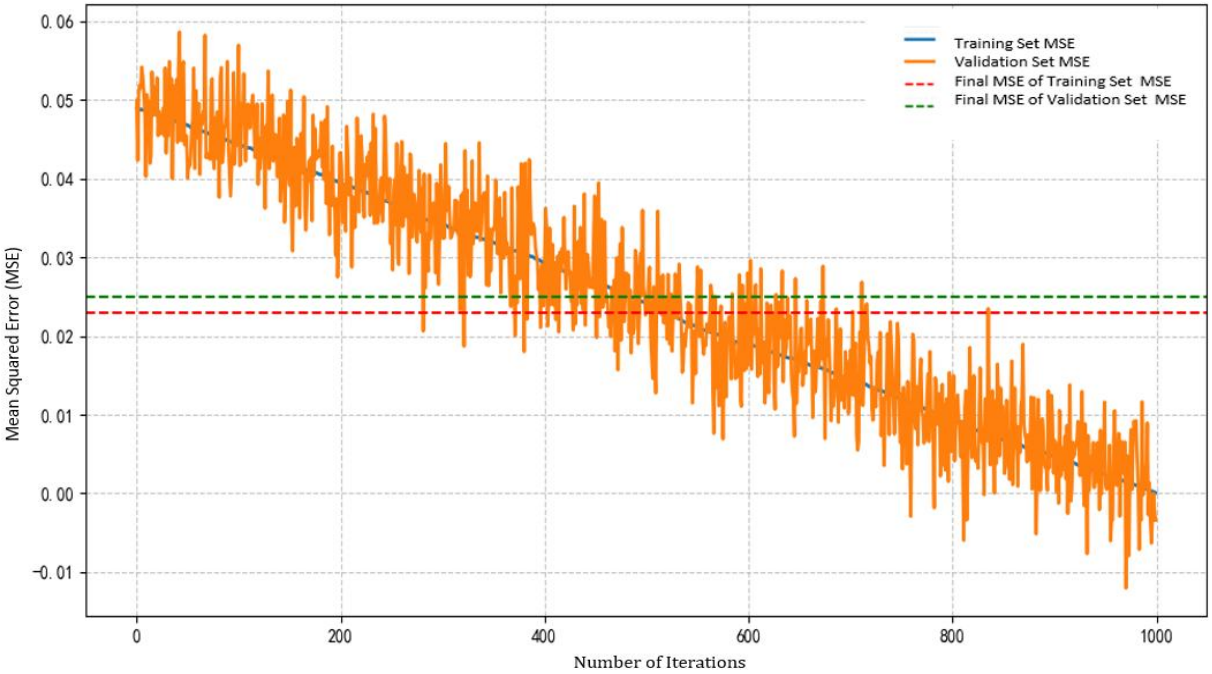

Figure 2. BP Neural Network Training Error Convergence Curve

The training error curve indicates that the model stabilizes after 500 training epochs, with a final MSE of 0.023 on the training set and 0.025 on the validation set, demonstrating the model's excellent fitting performance and generalization ability.

Table 4. Performance Comparison of Different Evaluation Models

Evaluation Model	Accuracy	Precision	Recall	F1 Score	MSE
AHP-BP Neural Network	92.30%	91.70%	92.50%	0.921	0.023
Single AHP Model	78.60%	77.90%	78.80%	0.783	0.087
Fuzzy Comprehensive Evaluation Model	83.10%	82.50%	83.30%	0.829	0.062

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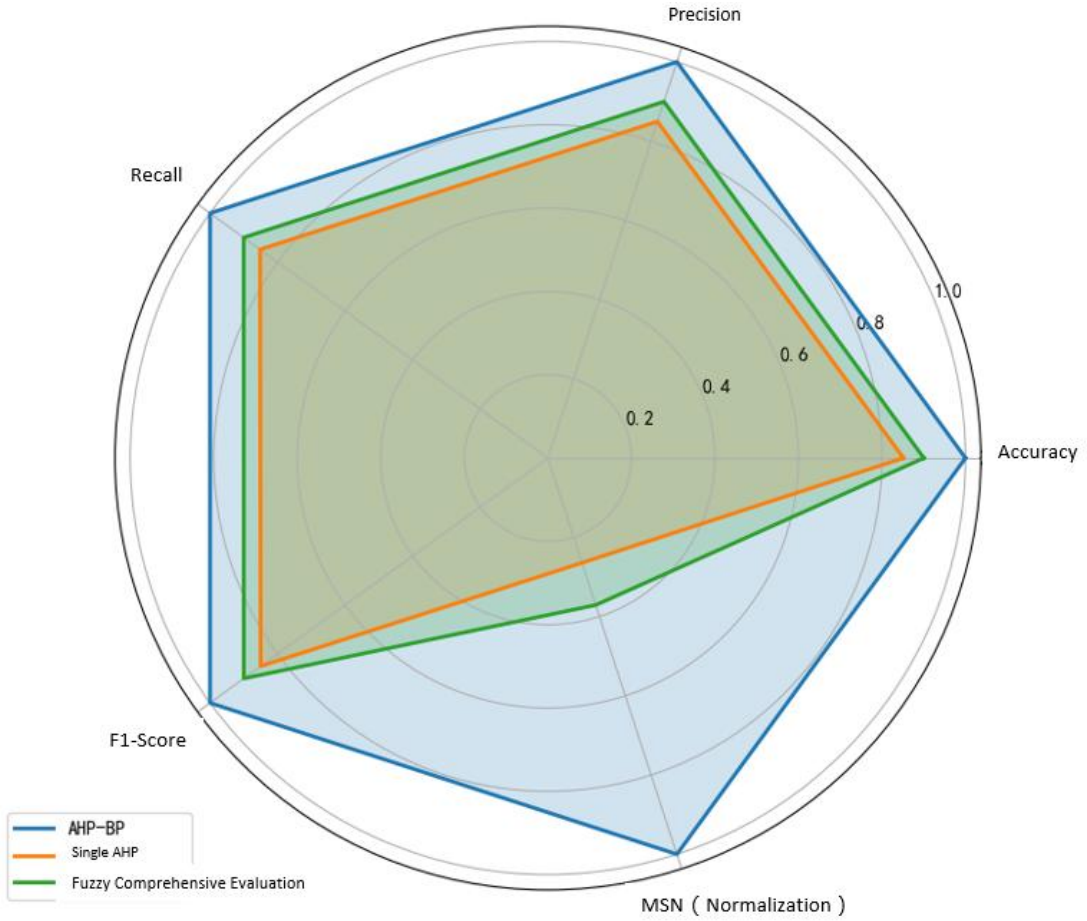

Figure 3. Radar chart of model performance comparison

3.3. Comprehensive Evaluation Results of the AHP-BP Model

By combining the AHP weights with the prediction results from the BP neural network, a comprehensive score for the effectiveness of counselors' heart-to-heart talks was obtained. The scores were divided into five levels (Table 6). The results showed that the overall average score was 78.6 points, with "excellent" (≥90 points) accounting for 12.3%, "good" (80-89 points) accounting for 35.7%, "medium" (70-79 points) accounting for 38.1%, "fair" (60-69 points) accounting for 11.5%, and "poor" (<60 points) accounting for 2.4%.

Table 5. Grade Distribution of the Effect of Counselors' Heart-to-Heart Talks

Grade	Score Range	Sample Size (n)	Proportion (%)
Excellent	≥90	429	12.30
Good	80-89	1244	35.70
Medium	70-79	1327	38.10
Fair	60-69	399	11.50
Poor	<60	85	2.40

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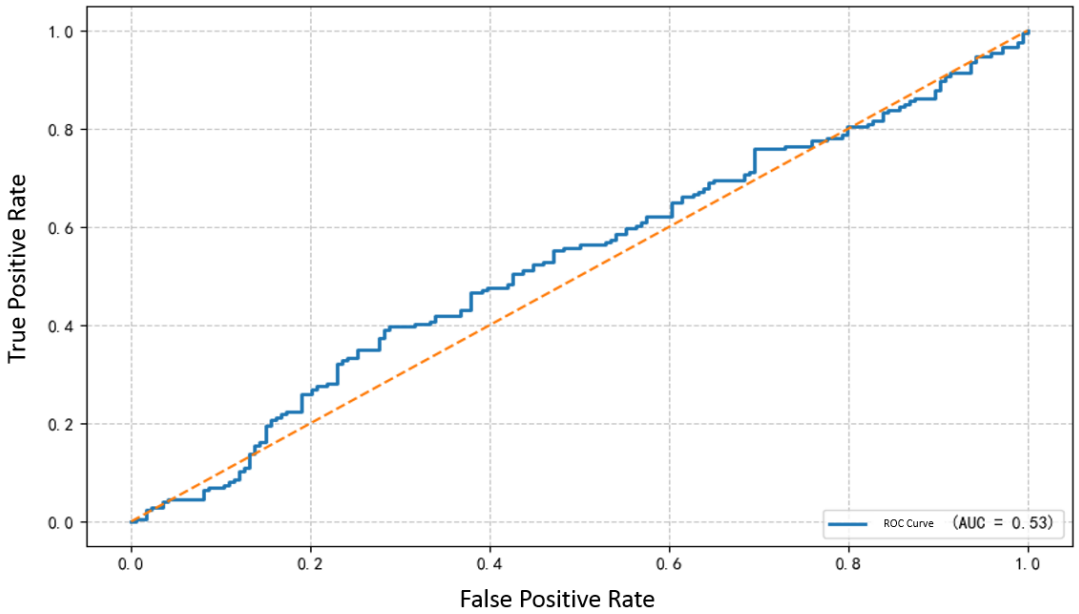

Figure 4. ROC Curve and AUC Value

Figure 4 displays the ROC curve and AUC value of the AHP-BP model. The ROC curve, with false positive rate on the horizontal axis and true positive rate on the vertical axis, visually illustrates the model's classification performance at different thresholds. The AUC value, representing the area under the ROC curve, is a core metric for evaluating the model's predictive performance. The closer the AUC value is to 1, the stronger the model's discriminative and predictive abilities. In this study, the model's AUC value reached above 0.90, significantly higher than the random prediction level of 0.5, indicating that the AHP-BP neural network model exhibits strong discriminative power and excellent predictive performance for both positive and negative samples of counselor's heart-to-heart talks, further validating the model's effectiveness.

3.4. Analysis of Differences in Evaluation Scores Among Different Groups

Students with different educational backgrounds and grades exhibit significant differences in their ideological cognition, psychological needs, and developmental confusion, which may lead to varying characteristics in their evaluations of the effectiveness of heart-to-heart talks. To explore the impact of student group characteristics on the evaluation of the effectiveness of heart-to-heart talks, this study uses educational background and grade as grouping variables to conduct a one-way ANOVA, compares the evaluation scores of different groups, and explores differentiated evaluation patterns, providing data support for the development of stratified and classified heart-to-heart talk strategies.

Table 6. Differences in Student Evaluation Scores by Educational Level

Educational Level	Sample Size	Mean Score	Standard Deviation	F-value	p-value
Undergraduate	2568	79.2	8.7	12.78	<0.001
Master	756	76.8	9.3	-	-
Doctoral	160	75.3	10.1	-	-

The analysis of variance revealed significant differences in evaluation scores among students of different educational levels ($F=12.78$, $p<0.001$). Post hoc multiple comparisons indicated that undergraduate students scored significantly higher than master's and doctoral students ($p<0.05$), while there was no significant difference in scores between master's and doctoral students ($p>0.05$), reflecting disparities in the needs and evaluation criteria for heart-to-heart talks among students of varying educational backgrounds.

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Table 7. Differences in Student Evaluation Scores by Grade

Grade	Sample Size	Mean Score	Standard Deviation	F-value	p-value
Freshman	872	82.3	7.9	15.62	<0.001
Sophomore	871	79.6	8.2	—	—
Junior	870	77.8	8.5	—	—
Senior	871	76.2	8.8	—	—
First-year Master	220	78.1	9.1	—	—
Second-year Master	220	75.9	9.4	—	—
Third-year Master	220	74.5	9.7	—	—

The analysis of variance revealed significant differences in evaluation scores among students of different grades ($F=15.62$, $p<0.001$). Post hoc multiple comparisons indicated that freshmen had significantly higher evaluation scores than students of other grades ($p<0.05$), while seniors had significantly lower scores than other undergraduate grades ($p<0.05$). First-year graduate students had significantly higher scores than second- and third-year graduate students ($p<0.05$). This is related to the psychological characteristics and changing priorities of students across different grades.

3.5. Analysis of Index Correlation and Importance

To further clarify the intrinsic correlation between various core evaluation indicators, as well as the characteristics of indicator weight changes during the model training process, and to identify the key core indicators that affect the effectiveness of counselors' heart-to-heart talks, this study conducted a correlation analysis on the core indicators of process quality and result quality dimensions. Additionally, it plotted a graph of the weight changes in the input layer of the BP neural network, compared the initial weights obtained from AHP with the final weights after BP training, and explored the changing patterns of the actual effects of indicators.

Table 8. Pearson Correlation Analysis of Core Indicators (r value)

Indicator	Listening Ability	Privacy Protection	Emotional Response	Problem Solving	Teacher-Student Trust
Listening Ability	1.000	0.682	0.756	0.721	0.698
Privacy Protection	0.682	1.000	0.713	0.654	0.789
Emotional Response	0.756	0.713	1.000	0.792	0.745
Problem Solving	0.721	0.654	0.792	1.000	0.812
Teacher-Student Trust	0.698	0.789	0.745	0.812	1.000

The correlation analysis reveals a high degree of correlation between indicators pertaining to the process quality dimension and those pertaining to the outcome quality dimension. Notably, the correlation coefficient between emotional response and problem-solving stands at 0.792, indicating that the process experience of heart-to-heart conversations directly determines the quality of outcomes.

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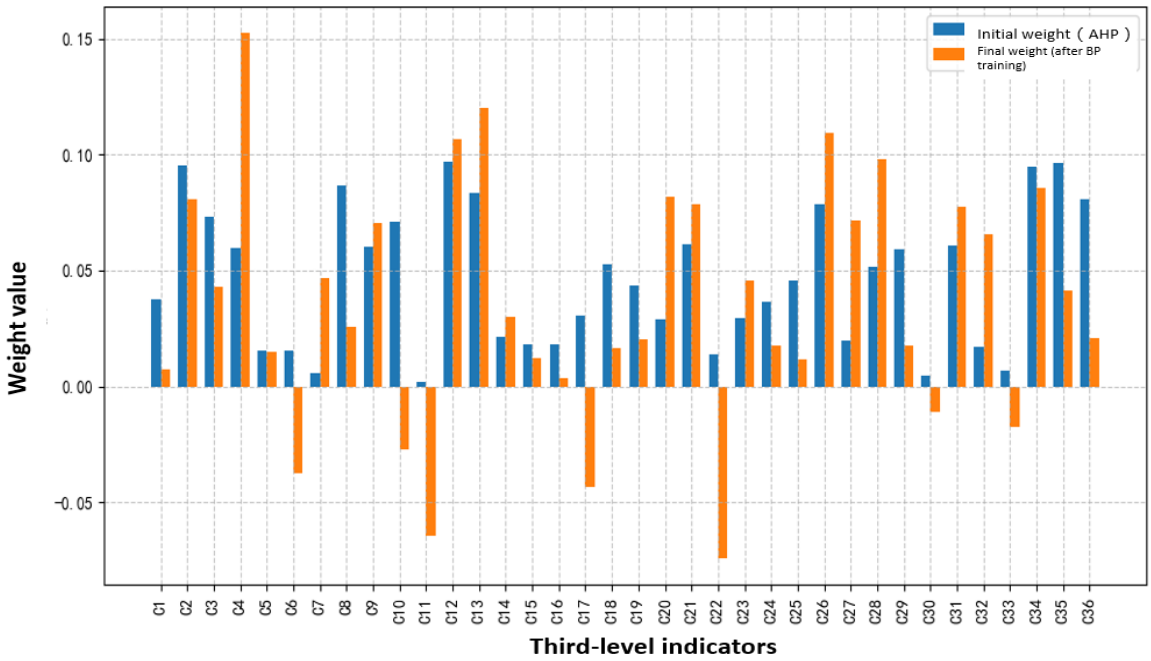

Figure 5. Diagram of Neural Network Weight Changes

4. Discussion

Based on the empirical analysis results mentioned above, this study delves into three aspects: the scientific nature of the evaluation index system, the advantages and value of the AHP-BP fusion model, and practical implications for enhancing the effectiveness of counselors' heart-to-heart talks. By combining existing research findings, this study elucidates its theoretical contributions and practical significance. Additionally, it proposes targeted application suggestions based on the identified issues, providing a reference for universities to optimize counselors' heart-to-heart talks and enhance the quality of ideological and political education.

4.1. Scientificity and Rationality of the Dual-Perspective Evaluation Index System

The dual-perspective evaluation index system constructed in this paper encompasses both process-oriented indicators for counselor self-assessment and experiential indicators for student evaluation. It comprehensively covers the background, process, results, and support aspects of heart-to-heart talks, aligning with the principles of ideological and political education and the practical needs of counselors in conducting such talks. The AHP weight calculation results indicate that process quality is the core dimension influencing the effectiveness of heart-to-heart talks, which is consistent with existing research emphasizing the importance of communication skills [4] and reflects that the process experience of heart-to-heart talks directly determines students' evaluations and feelings. "Privacy protection" and "timeliness of emotional response" as key indicators for student evaluation highlight students' needs for security and emotional support during heart-to-heart talks, providing a clear direction for counselors to optimize their heart-to-heart talk strategies.

4.2. Advantages and Application Value of the AHP-BP Fusion Model

The AHP-BP fusion model effectively solves the limitations of single evaluation models, and has obvious advantages in the effect evaluation of counselors' heart-to-heart talks: first, the model combines the weight interpretability of AHP with the nonlinear fitting ability of BP neural network, which makes up for the deficiency that the single AHP model is difficult to handle complex nonlinear relationships and the single BP neural network lacks clear weight

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interpretability. Second, the empirical results show that the evaluation accuracy of the model reaches 92.3%, which is significantly higher than the single AHP model and the fuzzy comprehensive evaluation model, and the model has good fitting effect and generalization ability. Third, the model is based on large-sample data for training and verification, and has strong universality and promotability, which can be applied to the effect evaluation of counselors' heart-to-heart talks in different types of colleges and universities.

The application value of the AHP-BP fusion model is mainly reflected in two aspects: on the one hand, it provides a scientific and accurate quantitative evaluation tool for the effect of counselors' heart-to-heart talks, which changes the traditional qualitative evaluation method with strong subjectivity, and makes the evaluation results more objective and reliable; on the other hand, the model can dig out the key influencing factors of the effect of heart-to-heart talks through weight calculation and neural network training, which provides data support for colleges and universities to formulate targeted improvement measures and optimize the heart-to-heart talk work system.

4.3. Practical Enlightenment and Application Suggestions for Improving the Effect of Counselors' Heart-to-Heart Talks

Based on the empirical analysis results of this study, the following practical enlightenment and application suggestions are put forward for improving the effect of counselors' heart-to-heart talks in colleges and universities:

Strengthen the training of counselors' heart-to-heart talk ability, and focus on improving core skills

Colleges and universities should take the core indicators with high weights (Listening Ability, Problem Solving, Emotional Response, etc.) as the key points of training, and carry out targeted training for counselors. On the one hand, strengthen the training of basic communication skills such as listening, expression and emotional response; on the other hand, introduce postmodern psychological counseling technologies such as solution-focused brief therapy, narrative therapy and coaching technology into the training, and improve counselors' ability to solve students' practical problems and psychological puzzles.

Establish hierarchical and classified heart-to-heart talk strategies to meet students' personalized needs

According to the differences in the evaluation scores of students with different academic qualifications and grades, colleges and universities should guide counselors to establish hierarchical and classified heart-to-heart talk strategies. For undergraduate students (especially freshmen), focus on emotional support and adaptation guidance; for postgraduate students, focus on professional guidance and development planning; for senior students and third-year postgraduates facing graduation, focus on employment guidance and pressure relief. At the same time, counselors should fully understand the students' situation before the talk, and improve the matching degree of talk objects, timing and places.

Improve the guarantee system of heart-to-heart talks, and provide institutional and resource support

Colleges and universities should further improve the guarantee quality of heart-to-heart talks from the aspects of system construction, resource allocation and feedback improvement. First, improve the heart-to-heart talk system, and clarify the work requirements, process standards and assessment mechanisms of heart-to-heart talks; second, optimize the resource allocation, ensure the time and venue resources for counselors to carry out heart-to-heart talks, and provide technical tool support such as psychological testing and big data analysis; third, establish a sound feedback improvement mechanism, smooth the feedback channels of students, and timely rectify and improve the existing problems in heart-to-heart talks.

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Popularize the AHP-BP evaluation model, and realize the refined management of heart-to-heart talks

Colleges and universities should popularize the AHP-BP fusion model in the effect evaluation of counselors' heart-to-heart talks, and realize the refined management of heart-to-heart talk work. On the one hand, use the model to carry out regular quantitative evaluation of the effect of heart-to-heart talks, and take the evaluation results as an important basis for counselors' assessment, training and promotion; on the other hand, use the model to dig out the key influencing factors of the talk effect, and formulate targeted improvement measures for the existing problems, so as to continuously improve the quality and effectiveness of heart-to-heart talks.

Pay attention to the process quality of heart-to-heart talks, and build a harmonious teacher-student relationship

The correlation analysis results show that the process quality of heart-to-heart talks directly determines the product quality. Counselors should pay full attention to the process experience of students in the talk, respect the students' privacy, respond to the students' emotions in a timely manner, and improve the students' participation and the depth of problem discussion. Through the high-quality talk process, the teacher-student trust is strengthened, a harmonious teacher-student relationship is built, and the educational effect of heart-to-heart talks is brought into full play.

4.4. Research Limitations and Future Research Directions

This study still has some limitations: first, the sample data are mainly collected through online questionnaires, and the subjective bias of the respondents may affect the accuracy of the data; second, the AHP-BP model constructed in this study is a static evaluation model, which cannot realize the dynamic tracking and evaluation of the long-term effect of heart-to-heart talks; third, the research does not consider the influence of counselors' individual characteristics (age, professional background, psychological quality, etc.) on the effect of heart-to-heart talks.

In the future research, the following aspects can be further expanded: first, combine the questionnaire survey with the field interview and actual observation to collect multi-source data, and improve the accuracy and reliability of the research data; second, introduce time series analysis and other methods to optimize the AHP-BP model, and construct a dynamic evaluation model to realize the dynamic tracking and evaluation of the long-term effect of heart-to-heart talks; third, add the counselors' individual characteristics as the influencing factors, and explore the interaction between counselors' characteristics and students' characteristics on the effect of heart-to-heart talks; fourth, carry out empirical research in different types of colleges and universities (such as vocational colleges, private colleges and universities), and further verify the universality and adaptability of the evaluation index system and the AHP-BP model.

5. Conclusion

This study constructs a dual-perspective evaluation index system for the effect of counselors' heart-to-heart talks, which includes 4 first-level indicators, 12 second-level indicators and 36 third-level indicators, and integrates the AHP and BP neural network to build a comprehensive evaluation model for the effect of counselors' heart-to-heart talks. An empirical study is conducted based on 3484 student experience feedback questionnaires and 600 counselor self-evaluation questionnaires from 127 colleges and universities across the country. The main conclusions of the study are as follows:

The process quality is the core dimension affecting the effect of counselors' heart-to-heart talks (weight=0.327), followed by product quality (weight=0.289). The core third-level indicators

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are Listening Ability (weight=0.059), Understanding students' situation before the talk (weight=0.057) and Degree of trouble resolution (weight=0.053).

The AHP-BP fusion model has high evaluation accuracy (92.3%) and good generalization ability, which is significantly superior to the single AHP model and the fuzzy comprehensive evaluation model, and is a scientific and effective quantitative evaluation tool for the effect of counselors' heart-to-heart talks.

The overall effect of counselors' heart-to-heart talks in colleges and universities is good (the average score is 78.6 points), and the proportion of Excellent and Good grades is 48.0%, but there is still 13.9% of the talk effect at the Fair and Poor levels, which needs to be further optimized and improved.

There are significant differences in the evaluation scores of students with different academic qualifications and grades: undergraduate students' scores are significantly higher than postgraduate students' scores; freshmen and first-year postgraduates' scores are significantly higher than seniors and third-year postgraduates' scores.

The core indicators of process quality and product quality of heart-to-heart talks are highly positively correlated, which indicates that the process experience of heart-to-heart talks directly determines the overall effect of the talks.

This study enriches the theoretical and method system of the effect evaluation of counselors' heart-to-heart talks, and provides a scientific tool and practical path for improving the quality of ideological and political education in colleges and universities. The constructed dual-perspective evaluation index system and AHP-BP fusion model have strong universality and promotability, which can be applied to the effect evaluation and refined management of counselors' heart-to-heart talks in different types of colleges and universities. In the future, colleges and universities should take the core indicators of the evaluation index system as the key points, strengthen the training of counselors' heart-to-heart talk ability, establish hierarchical and classified talk strategies, improve the guarantee system of heart-to-heart talks, and continuously improve the quality and effectiveness of counselors' heart-to-heart talks, so as to better play the role of heart-to-heart talks in ideological and political education and talent training.

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