

## Research Article

# The Cross-Postgraduate Training Mode Driven by Intelligent Signal Processing Technology: Taking the Major of Finance as an Example

Jian Zou and Yue Zhang 

*School of Mathematics-Physics and Finance, Anhui Polytechnic University, Wuhu 241000, China*

Correspondence should be addressed to Yue Zhang; [zhangyue@ahpu.edu.cn](mailto:zhangyue@ahpu.edu.cn)

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At present, various economic and social problems have become more complex, requiring a multidisciplinary perspective to seek solutions, and thus more complex and innovative talents are needed. Deepening the reform of postgraduate interdisciplinary education, improving the quality of postgraduate interdisciplinary education, and cultivating high-level technical talents with a multidisciplinary background, innovation ability and comprehensive quality have also become the core issues to be solved urgently in postgraduate education. This paper takes the interdisciplinary training mode of postgraduates in finance as the research object and uses interdisciplinary education theory, systems science theory, and higher education theory to explore the components and main characteristics of the postgraduate interdisciplinary training mode. On this basis, this paper investigates the current situation of interdisciplinary training of postgraduates in finance in Chinese universities and then analyzes and discusses the problems existing in the current mode of interdisciplinary cultivation of postgraduates in finance in my country. Finally, based on the above research results, relevant suggestions for improving the interdisciplinary training of postgraduates in finance in my country are put forward. The research results show that postgraduate interdisciplinary training is a new form of talent training that readjusts the source and composition of each training link after introducing the concept of interdisciplinary education. The components of the postgraduate interdisciplinary training model include interdisciplinary support elements and postgraduate training elements. The former provides interdisciplinary external support for postgraduate training, and the latter constitutes the main content of postgraduate interdisciplinary training. The research results can be used to guide the interdisciplinary educational practice of other types of postgraduates and provide certain theoretical and empirical references for cultivating more high-level compound talents urgently needed by society.

## 1. Introduction

The financial market is the center and link of the operation of the macroeconomic system [1, 2]. Financial talents are an important force to promote the continuous development of the financial market. Improving the comprehensive ability of students majoring in finance is of great significance to the continuous development and improvement of my country's financial market [3, 4]. Finance is an important major in China's higher education discipline system; almost all colleges and universities that offer economics and management majors have finance majors. Taking the major of finance as

an example to study the integration of interdisciplinary education into the curriculum system, the quality of education is of higher value. At the same time, finance is also a comprehensive major [5, 6]. It not only offers management courses such as management, finance, and accounting, but also economic courses such as economics, currency and banking, and investment, as well as mathematics, statistics, probability theory, econometrics, and other mathematics courses. Exploring the interdisciplinary education curriculum system for finance majors has high reference value for the teaching of other economic management majors and related mathematics and physics majors [7, 8]. As the top end of

financial education and an important source of high-level innovative talents, postgraduate education in finance majors, while being highly valued, is also facing enormous pressure for change from practical needs [9, 10]. The rapid development of science and technology, economy, and society has had a profound impact on the interdisciplinary structure. Various disciplines are highly differentiated and also highly integrated and gradually form a new interdisciplinary field [11]. In addition, China is facing economic transformation and industrial structure upgrading, requiring modern technology to transform traditional industries and vigorously develop high-tech industries, which requires the reserve of more high-level compound technical talents [12, 13]. Many economic and social problems and conflicts have also become extremely complex, showing the characteristics of the intersection of various fields, which transcend the boundaries of traditional single disciplines, and require a new vision of interdisciplinary to seek solutions [14, 15]. Various changes in today's era indicate that the cultivation of compound and innovative talents are of great significance, which means that the talent training model should be reformed from an interdisciplinary and multifield perspective [16, 17]. Postgraduate education is an important part of higher education, which should adapt to the times, trends, actively respond to the call of interdisciplinary, break professional boundaries, integrate disciplinary resources, realize cooperation between departments, etc. [18], to cultivate a large number of compound outstanding technical talents for scientific and technological progress, industrial upgrading, and social progress [19, 20].

Effective prediction and analysis of financial markets is a long-term goal [21, 22]. However, the financial market is a complex system with many unpredictable factors, unstructured, nonlinear, and chaotic phenomena [2, 23]. The behavior of the financial market is typically a nonlinear chaotic dynamic system with local randomness and global determination, the coexistence of periodic and aperiodic phenomena [24]. Therefore, it is difficult for people to express and obtain this nonlinear and unstructured data relationship, and it is difficult to grasp its high-risk changing trend. Under the new circumstances emerged modern financial theory, which stemmed from the work of Nobel Prize winner Markowitz. Intelligent information processing technology has established modern data analysis theory and model system for modern financial theory. From the concept of information processing, intelligent information processing is the use of computer and engineering methods to understand human intelligent behavior [25]. Financial data analysis and intelligent information processing technology is the use of artificial intelligence, artificial neural networks, chaos, genetic algorithm, intelligent decision support system, data mining, database knowledge discovery, and other methods [26]. In the globalized financial environment, the various factors that affect the behavior of the financial market are modeled, to predict and analyze the data with many unstructured and unpredictable factors in the financial market; and carry out resource development, management, service, and knowledge discovery [27]. Factors affecting financial market behavior include relevant market behavior (such as gold market, foreign exchange market, bond, and

stock market, and interest rate market), macroeconomic conditions, politics and policies, industrial structure, international situations and affairs, and human psychology factors. The financial industry is an industry that highly needs information resources, and the intelligent information processing technology of financial data analysis provides the theoretical framework of data analysis for modern financial theory [28]. Therefore, it is of great significance to integrate the intelligent signal processing system into the training of graduate students in finance.

Although the economic and social demand for high-level interdisciplinary technical talents is extremely urgent, because the interdisciplinary education for postgraduate finance in my country is still in the initial stage of exploration, there are still problems to be solved in terms of concepts, systems, and mechanisms. Therefore, in order to understand the problems more clearly and solve them effectively, it is necessary to strengthen the investigation and grasp the current situation of interdisciplinary training of finance graduate students and to improve and innovate the existing financial institutions in our country in a targeted manner by learning from the mature experience and practice of foreign universities. Learn the interdisciplinary training mode of postgraduates, and cultivate high-level compound technical talents who meet the actual needs of our country. This paper investigates the current situation of interdisciplinary cultivation of postgraduates in finance in my country, analyzes the problems existing in the current interdisciplinary cultivation model, and draws lessons from the experience and practice of interdisciplinary cultivation of postgraduates and applies the theoretical results of the research to the actual cultivation work. In this paper, relevant measures and suggestions for improving the interdisciplinary training mode of postgraduates in my country are put forward, which have certain practical significance for improving the interdisciplinary training of graduates in my country and improving the training quality of high-level compound talents. The technical route of this study is shown in Figure 1.

## 2. The Significance of Intelligent Signal Processing in Financial

*2.1. Financial Data Analysis by Artificial Intelligence Technology.* Artificial intelligence is a technology based on knowledge representation, acquisition, and reasoning, and an expert system is an important technology in the field of artificial intelligence [29]. The main elements of the expert system are knowledge representation, knowledge acquisition, and knowledge base. The structure of the expert system is knowledge base, that is, the knowledge of experts in specific fields, which is generally expressed by rules and facts; reasoning engine, that is, the reasoning tool that processes the expert domain and realizes the reasoning of the knowledge base; and the interpretation system, which expresses the deduced results.

The financial data analysis expert system includes a real-time monitoring system, which provides monitoring and control of various data (such as various transaction data in the financial market and various changes) and various

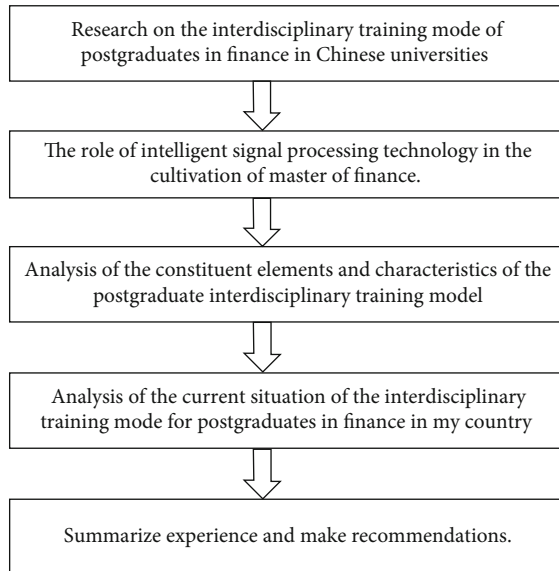


FIGURE 1: Research technology route.

changes (such as changes in financial market transactions) in the financial market [30]. Make corresponding responses according to changes in the environment; the data interpretation system establishes an effective model based on a large amount of data from various aspects of the financial market, provides an interpretation of various data, and enables it to understand the operation of the financial market.

The new generation of financial data analysis expert system integrates neural network, genetic algorithm, and other technologies. At this time, if a financial data analysis expert system is established, it is only necessary to give the expert system some data, including sample data and databases, and the expert system will effectively extract rules and develop knowledge from the training samples, add them to the knowledge base, and enable experts system more efficiently. Using this technology, the experience, insights, and skills of the world's best financial analysts will be available to more people. The characteristics of this new generation of expert systems are through effective methods; on the one hand, it acquires the knowledge of the expert domain, and on the other hand, it discovers the knowledge from the database and produces expert-level diagnosis for the given problem.

At present, the artificial intelligence technology of financial data analysis has been applied to the evaluation of company credit rating, risk assessment, engineering management and investment strategy analysis, financial and economic forecasting, forecasting of securities price changes, and forecasting of bankrupt bank failures. The development process is shown in Figure 2.

**2.2. Financial Data Analysis by Artificial Neural Network Technology.** During the eight years from 2011 to 2018, the nonperforming loan balance of my country's commercial banks increased from 427.9 billion yuan to 1,957.1 billion yuan, of which the nonperforming loan balance in June 2018 increased by 357% compared with December 2011;

the nonperforming loan ratio increased from 1% to 1.86%, showing an overall upward trend [31]. Judging from the trend in recent years, traditional financial institutions have many problems in risk management due to insufficient attention to system and process construction, insufficient ability to monitor default risks in a timely manner, and the lack of a systematic risk early warning mechanism. At the same time, under the environment of the implementation of the central bank's macroprudential assessment system (MPA) and the increasingly strict supervision, financial institutions need to change their previous management ideas and continuously enhance their active risk management and control capabilities by using artificial intelligence and other new technological means in order to cope with future risks. Figure 3 shows the NPL balance and NPL ratio of Chinese commercial banks from December 2011 to June 2018.

The artificial neural network is a directed network composed of a large number of processing units (that is, nodes representing the characteristics, concepts, patterns, etc. of different objects) that are based on the structure and characteristics of the human brain [32]. Each edge corresponds to a real number, called the connection weight. The artificial neural network is a parallel system dynamics model, which is a development of traditional statistics and statistical pattern recognition methods, especially suitable for simulating human intelligence in pattern recognition, associative memory, clustering, and classification activities. It has two characteristics: large-scale distributed structure and learning and adaptive capabilities.

The artificial neural network technology of financial data analysis is to predict, analyze, and manage financial data through data selection (data separation and processing) and learning methods [33], such as predictive analysis of stocks and securities, forecast and analysis of capital gains, risk management, and credit rating assessment. When artificial neural network technology is applied to the prediction analysis of financial data, it first selects historical records from the financial market and selects data from all the data obtained from the internet and then divides the data into training sample sets and test data sets and transforms the data. In order to be suitable for the input and output processing of the artificial neural network, the artificial neural network is trained with the training sample set, the training results are tested with the test data set, and the relevant neural network model and learning method are selected for financial data analysis. The learning algorithm is one of the core issues of artificial neural network technology for financial data analysis. It needs to study learning theories, such as self-reinforcing learning and self-organizing learning, to discover effective learning processes so that neural networks can construct the internal representation of financial markets. The weights are adjusted so that these internal representation units can express the important characteristics of the problems in the financial field. Because neural network reflects association, memory, and learning, has the characteristics of adaptability and nonlinear dynamics, and has the ability to approximate nonlinear functions, it is a potentially powerful tool for dealing with complex systems such as

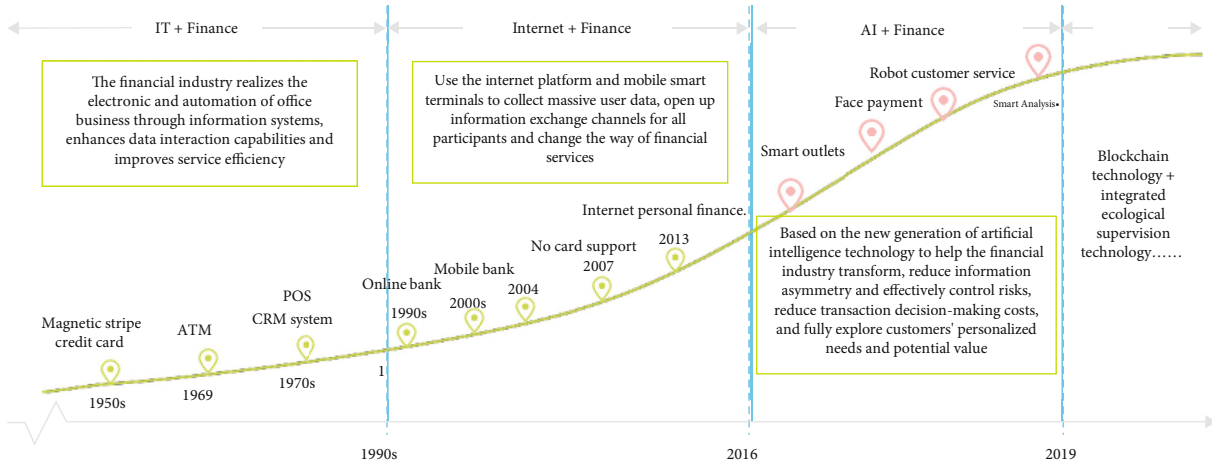


FIGURE 2: The development process of the technology-enabled financial industry.

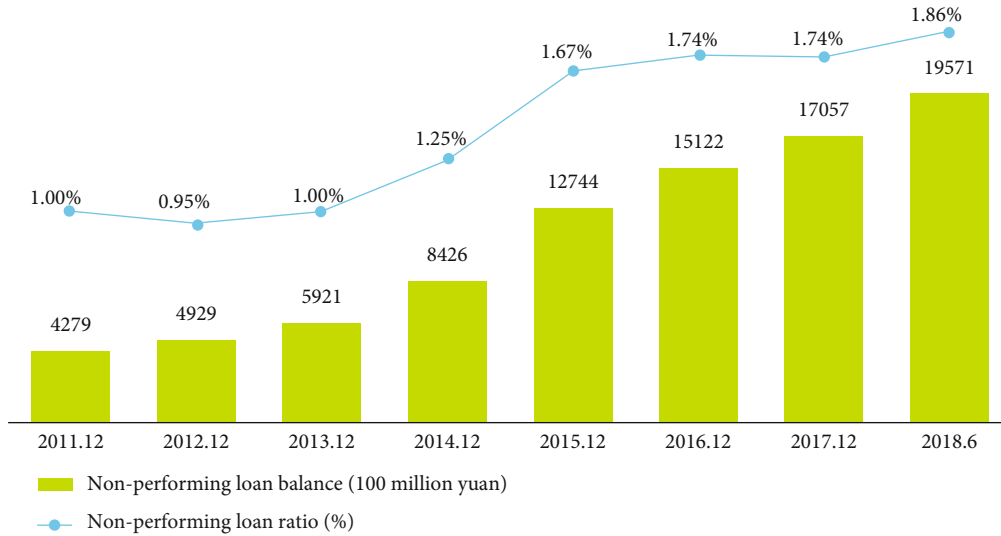


FIGURE 3: The NPL balance and NPL ratio of Chinese commercial banks from December 2011 to June 2018 [31].

financial markets. The relationship between AI + financial industry technology is shown in Figure 4.

2.3. Financial Data Analysis Genetic Algorithm Technology.

In the 1970s, Holland et al. proposed a genetic algorithm based on the principle of biological evolution, which simulates Darwin’s computational model of genetic selection and natural elimination, continuously optimizes the population in the process of solving, and then finds the optimal solution and quasi-optimal solution [34]. The genetic algorithm is a search algorithm based on the principle of natural selection and natural genetic mechanisms. It is regarded as an effective global parallel optimization search tool. It is simple, versatile, adaptable, and suitable for parallel processing. Genetic algorithms can be used for selection problems such as subset selection and model selection. The genetic algorithm technology of financial data analysis is to realize the optimization and management of investment and trading strategies, the optimization of decision-making strategies, the selection of securities investment, and the selection of

trend forecasting models by means of the genetic algorithm. For example, in the selection of a stock forecasting trend model, first, a binary decision tree is constructed through a genetic algorithm, and each endpoint in the decision tree corresponds to a type of data, representing a trend forecasting model; then the weight vector in the planning decision tree is selected to predict the best trend forecasting model.

The basic principle of the genetic algorithm applied to financial data analysis is to use the population of solutions as the work unit, to use the survival of the fittest principle imitating biological evolution to guide the search, and to improve the target. The quality of each group is evaluated by a value function that depends on the objective function of the problem. The search process is carried out through algebraic change (evolution), and the probability of an individual in each generation being inherited by the next generation is proportional to its fitness value. Use three base operators: copy, crossover, and mutation. Replication refers to the direct transmission of the parental individuals to the next generation in the population. This transmission is

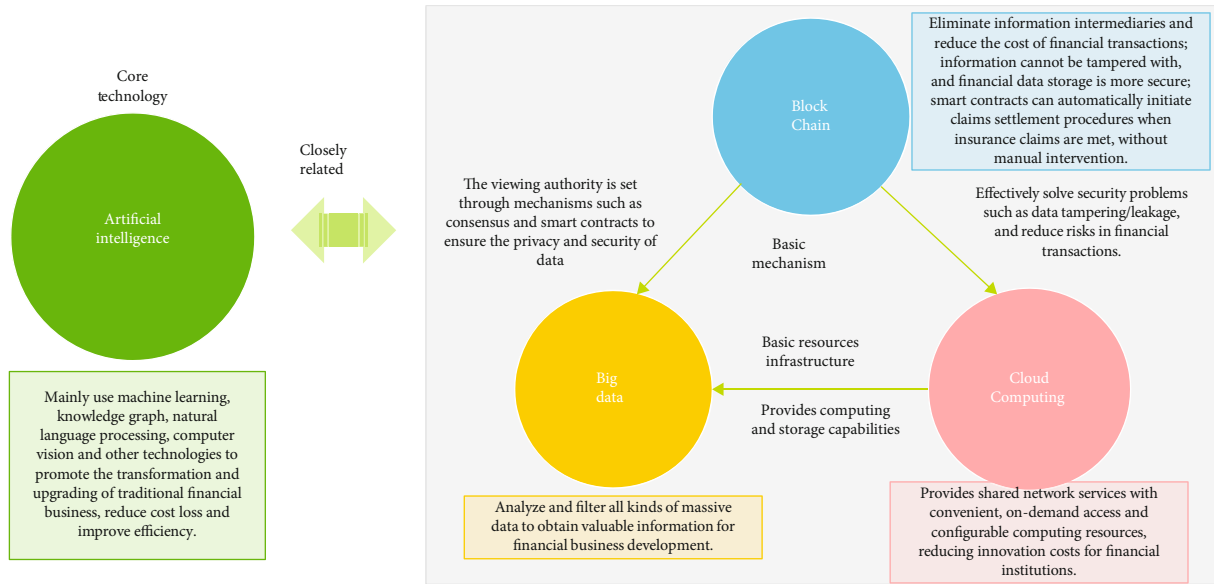


FIGURE 4: The relationship between AI + financial industry technology.

selective; that is, through replication, the number of outstanding individuals in the population is continuously increased, moving towards a better solution; crossover is to select two individuals from the population for mating and combine the characteristics of the two individuals to form a new individual; the new individual communicates its excellent genes through each individual and obtains a better solution structure than the parent; replication and crossover can only find the best in the existing arrangement and combination of genotypes, while mutation is to imitate mutation theory to change individual genes in a small number of individuals in the population, generate new genotypes, and expand the scope of optimization, that is, mutation. The goal is to increase the diversity of the population and obtain a wider search range.

2.4. *Financial Data Analysis Data Mining System.* Knowledge Discovery in Database (KDD) is the process of extracting accurate, previously unknown and potentially promising, nontrivial and valuable knowledge from the database using machine learning methods [35]. Secondary processing technology, through KDD, finds laws and patterns from a large amount of data, discovers and understands knowledge, and applies this knowledge in the decision-making process. KDD is a multistep process: (1) preparation: understand the user’s requirements; (2) data selection: according to the user’s requirements, use database operations to extract KDD-related data from the database; (3) data preprocessing: reprocessing selected data, processing noise data, filling missing data, etc.; (4) data compression: according to the task of knowledge discovery, use operations such as projection to compress the preprocessed data to reduce the amount of data; (5) determine the KDD target: according to user requirements, determine what type of knowledge KDD is to discover; (6) determine the knowledge discovery algorithm: according to the KDD goal, select the appropriate knowledge discovery algorithm (including appropriate models and parameters);

(7) data mining: using the selected knowledge discovery algorithm, extract the knowledge needed by the user from the data, and express it in a specific way; (8) explanation of patterns: interpret the discovered patterns in order to obtain effective knowledge. In order to obtain more effective knowledge, it is common to return to some of the previous steps for repeated extraction; (9) knowledge evaluation: present the discovered knowledge to the user. The specific route is shown in Figure 5.

The biggest feature of KDD is to analyze the hidden features and trends behind the data, and finally give the overall features and trends of the data. If artificial intelligence technology is to use the knowledge and experience of experts to make decisions, then KDD is to discover the knowledge hidden in the data from a large amount of data. Discover useful data patterns, and understand the behavior of complex problems through data analysis; make effective predictions through data mining tacit knowledge.

### 3. The Components of the Postgraduate Interdisciplinary Training Model

3.1. *Elements Analysis of Postgraduate Training Mode.* The outstanding feature of interdisciplinary is to break the boundaries of single disciplines, realize the knowledge integration of two or more disciplines, and form a cross-domain, multilevel, comprehensive, and comprehensive discipline interaction situation. The postgraduate interdisciplinary training model is a horizontal training model established on the background of multidisciplinary education under the guidance of the interaction between disciplines and the law of talent training according to society’s demand for high-level compound talents. According to the point of view of system theory, the postgraduate interdisciplinary training model can be regarded as a system formed by the interaction of many factors. To understand its operation mode, it is necessary to decompose its elements first.

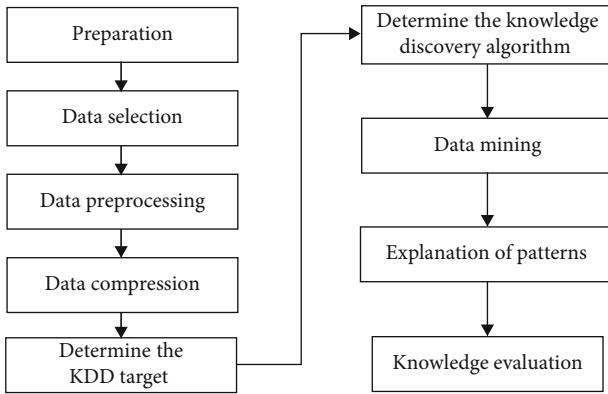


FIGURE 5: Process of KDD.

Graduate education has developed into the main way to train high-level talents and is an important part of the national innovation system. Each training unit has also been committed to the reform and development of graduate training. Especially since the reform and opening up, the demand for high-level talents in economic and social development has tended to be diversified. Innovating the training mode of postgraduates and improving the quality of postgraduate education has become the top priority of higher education reform. As the basic function of colleges and universities, talent training has always received the attention and research of many scholars. Among them, the talent training mode is a constraint mechanism on how to train people systematically and regularly and stipulates the specifications and methods of talent training. The postgraduate training mode is a special type of talent training mode, which has relatively high requirements on the quality of talents, and presents differences due to different standards of training objects and training objectives. In order to clarify the constituent elements of the postgraduate training model, this paper reviews the relevant domestic papers after 2000, sorts out the scholars' views on the constituent elements of the graduate training model, and categorizes them, as shown in Table 1.

Since the training process itself contains many guarantee factors for the smooth progress of postgraduate training, it can be further subdivided. From the perspective of graduate training rules and the development sequence of training work, this paper subdivides the graduate training process into five subblocks: student selection, faculty, curriculum, professional training, and graduation thesis. Scientific training and practical training are the two aspects of professional training. Figure 6 shows the selection process of the elements of the postgraduate training model.

**3.2. Analysis of the Relationship between the Elements of the Postgraduate Training Mode.** If the postgraduate training model is regarded as a system, its constituent elements can be regarded as the components of the system. The sum of the components and the ways in which they are related becomes the structure of the system. According to the definitions and functions of the three main links of

the postgraduate training model, their relationship is as shown in Figure 7.

Among them, the postgraduate training process includes five subelements: student selection, faculty, curriculum, professional training, and graduation thesis. These subelements are divided in an orderly manner in the training process, closely linked to each other, and interrelated to jointly ensure the overall training process. According to the sequence of talent training from resource input to output, the role relationship of each subelement in the training process is shown in Figure 8.

**3.3. Interdisciplinary Education Concept.** The reform of interdisciplinary education is not only about opening a few more elective courses and setting up a few more interdisciplinary majors, but also involves complex and comprehensive problems in many aspects such as science, technology, society, economy, education, thinking, and traditional habits. Fundamentally speaking, it is a systematic, comprehensive, and holistic change. The deep-level interdisciplinary educational reform not only includes interdisciplinary ideas but also involves many viewpoints on the reform of the educational theoretical system. The concepts, systems, platforms, disciplines, and other factors involved in the reform of interdisciplinary education are not independent of each other but are involved in the formation of a complete interdisciplinary education system, and their interaction affects the interdisciplinary education system and normal functioning. Among them, the interdisciplinary concept leads the overall situation of interdisciplinary education, the organizational management system provides the basic institutional guarantee for interdisciplinary education, the resource integration mechanism is the main development path of interdisciplinary education, and the intersection of disciplinary fields is the core fulcrum of interdisciplinary education. Figure 9 shows the relationship between the factors involved in interdisciplinary education reform.

## 4. Survey of Interdisciplinary Training of Postgraduates in Finance

**4.1. Questionnaire Design.** Considering the disciplinary advantages and geographical distribution of colleges and universities comprehensively, according to the geographical division of Northeast China, North China, East China, Central South, Northwest, and Southwest China, 20 comprehensive and financial colleges and universities were selected, and teachers and postgraduates in the financial field of these colleges and universities were selected as the research objects. Conduct interviews and questionnaires on the current situation of postgraduate interdisciplinary training, respectively, and find out the resistance and problems of interdisciplinary training of postgraduates in finance, so as to provide useful reference for domestic universities to further explore postgraduate interdisciplinary education. After consultation and discussion with relevant experts, 37 evaluation indicators were comprehensively determined. The evaluation index system of the interdisciplinary training model is shown in Table 2.

TABLE 1: Literature review of the elements of the postgraduate training model.

Number of elements	Point of view
Three elements	Educational philosophy, training process, supporting conditions
Four elements	Educational philosophy, training objectives, training process, condition guarantee
Five elements	Enrollment situation, research direction, curriculum setting, practice link, faculty structure
Six elements	Training objectives, training methods, curriculum system, training process, management system, quality evaluation
Multielement	Training concept, training objectives, mentor team, training system, training organization, program implementation, platform construction, training evaluation

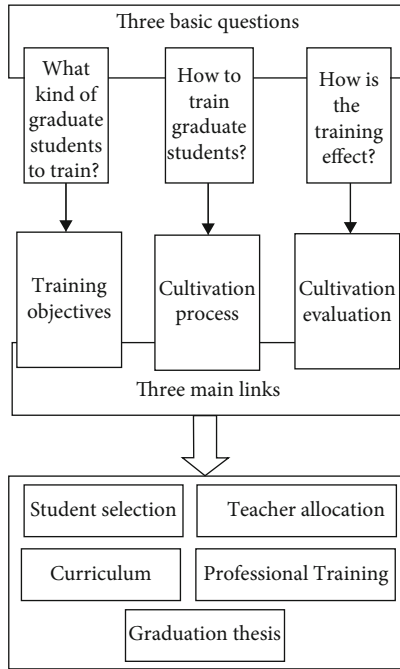


FIGURE 6: The selection process of the elements of the postgraduate training model.

A total of 350 questionnaires were distributed, and 328 questionnaires were recovered, with a recovery rate of 93.7%, of which 317 were valid questionnaires, with an effective rate of 96.7%. Among them, 47.79% of the respondents indicated that they had interdisciplinary study experience, and 38.05% of the respondents indicated that they had interdisciplinary research experience. The number of recommended students accounted for 37.61% of the total sample, while the number of interprofessional applicants only accounted for 16.37% of the total sample.

4.2. *Data Analysis Method.* Regression analysis is a scientific method for statistical analysis of the laws of quantitative changes among data. Its main purpose is to describe, explain, or predict the dependence between a dependent variable and one or more independent variables. In regression analysis, if there are more than two independent variables, it is called multiple linear regression score. The explanatory power of the dependent variable is greater. This study is based on the questionnaire sample data, using SPSS statistical software for multiple linear regression analysis.

The specific process of the multiple linear regression method is as follows:

- (1) Assuming the existence of a linear regression equation, its form can be assumed as follows:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \dots + b_mX_m \quad (1)$$

- (2) Make the values of  $\hat{Y}$  and  $Y$  the closest

$$Q = \sum (Y - \hat{Y})^2 \quad (2)$$

If the linear regression equation exists, then we ask for the coefficient  $b_i$  and the constant term  $b_0$  in front of each term  $X$ . To make the obtained regression equation work better, that is, make the predicted value (estimated value) the closest to the sample value  $Y$ . To minimize the sum of squared errors  $Q$ , use the least squares method to avoid the problem of positive and negative cancellation. Then the problem of making the regression model most effective is transformed into the problem of finding the minimum value of  $Q$ .

$$Q = \sum (Y - \hat{Y})^2 = \sum [Y(b_0 + b_1X_1 + b_2X_2 + \dots + b_mX_m)]^2 \quad (3)$$

Taking the derivative of Equation (3), we get

$$b_0 = \sum (Y - \hat{Y})^2 = \bar{Y} - (b_1\bar{X}_1 + b_2\bar{X}_2 + \dots + b_m\bar{X}_m). \quad (4)$$

To find the minimum value of  $Q$ , after substituting the predicted value, obtain the partial derivative of  $X_1 \dots X_m$  to obtain a linear equation system, and solve it by the matrix method to obtain  $b_0 \dots b_m$ , that is, the constant term and the coefficient value.

After each coefficient is obtained according to the above method, the significance of the equation and the partial regression coefficient should be tested, that is, whether the obtained regression equation reaches statistical significance and whether it reaches the significant level of 0.05. Unlike univariate regression, the coefficients here are called partial regression coefficients because there is more than one independent variable. Total deviation sum of squares

$$ss_0 = ss_1 + ss_2. \quad (5)$$

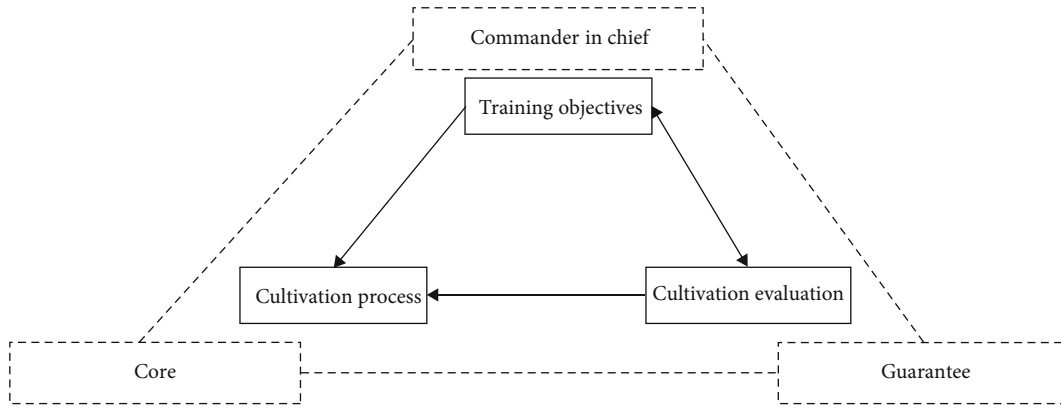


FIGURE 7: The role and relationship of the elements of the training model.

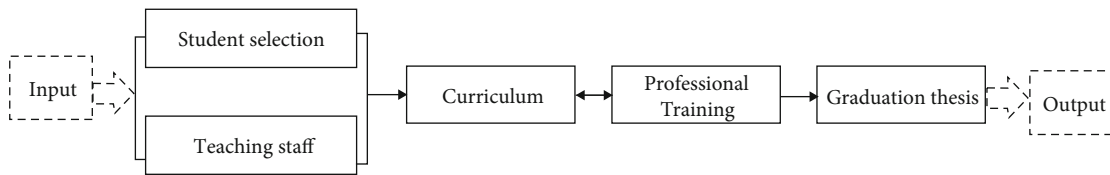


FIGURE 8: Cultivation process subelement relationships.

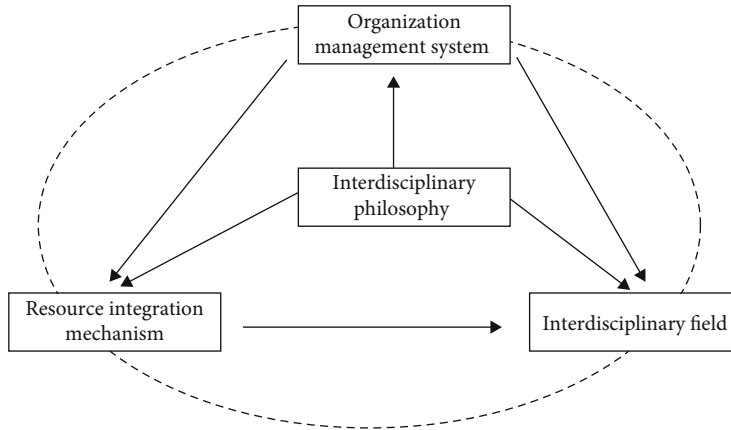


FIGURE 9: The relationship between factors involved in interdisciplinary education reform.

$SS_1$  is regression sum of squares;  $SS_2$  is the residual sum of squares.

$$ss_1 = \sum (\hat{Y} - \bar{Y})^2, \tag{6}$$

$$ss_2 = \sum (Y - \hat{Y})^2 \tag{7}$$

Decisive factor is

$$R^2 = \frac{ss_1}{ss_0}. \tag{8}$$

The closer the coefficient is to 1, the better the model fits the data.

### 4.3. Data Analysis

4.3.1. *Univariate Analysis.* Taking interdisciplinary concepts, training pertinence, and problem-solving awareness as independent variables and training objectives as dependent variables, by applying the multiple linear regression analysis functions of SPSS, the output results are as follows:

From the coefficients in Table 3, the standardized regression model can be obtained as follows:

$$\begin{aligned} \text{Training goal} = & 0.324 \times \text{interdisciplinary concept} \\ & + 0.418 \times \text{training pertinence} \\ & + 0.438 \times \text{problem - solving awareness.} \end{aligned} \tag{9}$$



TABLE 2: Evaluation index system of interdisciplinary training mode.

Component	Elements	Index	
Supporting elements	Interdisciplinary philosophy	The connotation expression of the interdisciplinary idea, the manifestation of the interdisciplinary idea	
	Organizational management	The organizational form of postgraduate education, the situation of postgraduate training management condition	
	Cooperative institutions	Types of cooperative institutions and strength of cooperation	
	Academic area	Disciplinary majors and interdisciplinary research directions involved in postgraduate training	
Cultivation elements	Training objectives	Interdisciplinary concept, cultivation of pertinence, problem-solving awareness	
	Student selection	Awareness of interprofessional admissions, multidisciplinary examination questions, interprofessional admission ratio	
	Faculty	The situation of teachers coming from multidisciplinary fields, the importance of teachers on interdisciplinary education	
	Cultivation process	Curriculum	The situation of the curriculum involves multiple disciplines, the use of interdisciplinary learning methods
		Professional training	Interdisciplinary research (practice) training experience, application of interdisciplinary knowledge or methods
	Graduation thesis	The selection of topics for interdisciplinary graduation thesis and the use of interdisciplinary knowledge and methods	
	Cultivation evaluation	The pertinence of the evaluation system and the validity of the evaluation results	

TABLE 3: Coefficients of the training target fitting equation.

Model	Unstandardized coefficients		Standardized coefficient Beta	<i>t</i>	Salience
	<i>B</i>	Standard error			
(Constant)	0.024	0.106		0.223	0.824
Interdisciplinary philosophy	0.311	0.027	0.324	11.654	0.000
Cultivate pertinence	0.326	0.025	0.418	13.113	0.000
Problem-solving awareness	0.361	0.027	0.438	13.570	0.000

TABLE 4: Summary table of multiple linear regression analysis of training objectives.

Independent variable	<i>B</i>	Standard error	Beta	<i>t</i>
Intercept	0.024	0.106		0.223
Interdisciplinary philosophy	0.311	0.027	0.324	11.654
Cultivate pertinence	0.326	0.025	0.418	13.113
Problem-solving awareness	0.361	0.027	0.438	13.570

It can be seen from the standardized regression model that the influence of the three independent variables on the dependent variable is, in descending order, problem-solving awareness, cultivating pertinence, and interdisciplinary concepts. Since the standardized regression coefficients of the independent variables are all positive numbers, it shows that its influence on the dependent variable is positive, and the significance test *t* value of the regression coefficient of the independent variable is 11.654 ( $p = 0.000 < 0.05$ ), 13.113 ( $p = 0.000 < 0.05$ ), and 13.570 ( $p = 0.000 < 0.05$ ), and it can be seen that the regression coefficients of all independent variables have reached a significant level.

Table 4 is a summary of the output results of the above regression analysis. It can be clearly seen from the table that the multivariate correlation coefficient between the three independent variables of interdisciplinary concept, training pertinence, and problem-solving awareness and the training target dependent variable is 0.931, and the multivariate correlation coefficient is 0.931. The square of the coefficient was 0.867, indicating that the three independent variables could explain 87.6% of the variance of the culture target dependent variable. In the standardized regression model, the three independent variables have a significant impact on the training target dependent variable, and the standardized regression coefficients of the three independent variables are all positive numbers, which means that the three independent variables have a positive impact on the training target dependent variable to influence. Among them, from the perspective of standardized regression coefficient values, among the three independent variables with significant regression coefficients, the Beta values of problem-solving awareness and training pertinence are relatively large, indicating that these two variables have higher explanatory power and better cultivating goals. The explanatory power and influence of interdisciplinary ideas are relatively weak.

Using the same method, there are 22 evaluation indicators for the elements of the training process. These evaluation indicators can be classified according to the selection of students, teaching staff, curriculum, professional training, and graduation thesis. The standardized regression model is as follows:

$$\begin{aligned} & \text{Selection of student sources} \\ & = 0.427 \times \text{awareness of inter - professional admissions} \\ & \quad + 0.448 \times \text{the situation that the examination} \\ & \quad \text{questions involve multiple disciplines} \\ & \quad + 0.497 \times \text{inter - professional admission ratio.} \end{aligned} \quad (10)$$

Taking the situation of teachers from multidisciplinary fields, the importance of teachers on interdisciplinary education, and the degree of teachers guiding students across disciplines as independent variables and the teaching staff as dependent variables, by applying the multiple linear regression analysis function of SPSS, the output results are as follows:

$$\begin{aligned} \text{Teachers} & = 0.426 \times \text{teachers from multidisciplinary fields} \\ & \quad + 0.404 \times \text{teacher emphasis on} \\ & \quad \text{interdisciplinary education} + 0.409 \\ & \quad \times \text{teacher interdisciplinary guidance to students.} \end{aligned} \quad (11)$$

Taking the situation of interprofessional students taking supplementary courses, the situation of cross-faculty elective courses, the situation of courses involving multiple disciplines, and the situation of using interdisciplinary learning methods as independent variables and course setting as the dependent variable, through the application of SPSS multiple linear regression analysis function, the output is as follows:

$$\begin{aligned} & \text{Curriculum setting} \\ & = 0.282 \times \text{situation of interdisciplinary students} \\ & \quad \text{taking professional courses} + 0.302 \\ & \quad \times \text{situation of elective courses across departments} \\ & \quad + 0.249 \times \text{situation of courses involving multiple} \\ & \quad \text{disciplines} + 0.304 \times \text{interdisciplinary learning} \\ & \quad \text{methods.} \end{aligned} \quad (12)$$

Taking the topic selection of interdisciplinary graduation thesis, the use of interdisciplinary knowledge and methods, the situation of defense experts from different fields, and the evaluation of graduation thesis from an interdisciplinary perspective as independent variables and graduation thesis as the dependent variable, through the application of SPSS, the multiple linear regression analysis function of, the output results are as follows:

$$\begin{aligned} & \text{Graduation dissertation} \\ & = 0.256 \times \text{situation of interdisciplinary} \\ & \quad \text{graduation thesis topic selection} + 0.310 \\ & \quad \times \text{situation of applying interdisciplinary} \\ & \quad \text{knowledge and methods} + 0.252 \\ & \quad \times \text{situation of defense experts from different fields} \\ & \quad + 0.289 \times \text{situation of reviewing graduation} \\ & \quad \text{thesis from an interdisciplinary perspective.} \end{aligned} \quad (13)$$

4.3.2. *Overall Analysis.* Combining all of the above multiple regression analysis results, the main influencing factors of seven training elements, including training objectives, student selection, faculty, curriculum, scientific research training, practical training, and graduation thesis, can be obtained. The details are listed in Table 5.

For the training target elements, the two factors of problem-solving awareness and training pertinence are more influential than the interdisciplinary concept factor; for the student source selection element, the interprofessional admission ratio factor is more important than the multidisciplinary admissions test questions. Two factors, the situation and the awareness of interprofessional enrollment, have more influence on it; for the elements of the teaching staff, there are three factors: the situation of teachers from multidisciplinary fields, the degree of teachers' interdisciplinary guidance to students, and the importance of teachers on interdisciplinary education. In terms of curriculum elements, the use of interdisciplinary learning methods, the use of interdisciplinary elective courses, and the interprofessional students taking supplementary professional courses have more influence than the factors involving courses involving multiple disciplines. For the elements of scientific research training, the degree of integration of scientific research resources inside and outside the school and the experience of interdisciplinary scientific research training are far more influential than the use of interdisciplinary knowledge or methods and the effectiveness of interdisciplinary scientific research training; for practical training elements, in terms of interdisciplinary practical training experience, the impact on it is far less than the use of interdisciplinary knowledge or methods, the effectiveness of interdisciplinary practical training, and the degree of integration of practical resources inside and outside the school. The selection of topics for graduation thesis and the situation of defense experts from different fields are two factors; the use of interdisciplinary knowledge and methods and the evaluation of graduation thesis from an interdisciplinary perspective have a greater impact on it.

4.3.3. *The Inadequacies of Graduate Education in Finance.* At present, these are the following problems in the interdisciplinary training of engineering postgraduates in Chinese universities: on the one hand, the interdisciplinary concept has not penetrated into the specific training links in a clear form, and the organization and management of

TABLE 5: Influence ranking of evaluation indicators of each training element.

Influence ranking	Training objectives	Student selection	Cultivation process			Graduation thesis
			Faculty	Curriculum	Professional training	
1	Problem-solving awareness (0.438)	Interprofessional admission ratio (0.497)	Teachers from multiple disciplines (0.426)	Use of interdisciplinary learning methods (0.304)	Use of interdisciplinary knowledge or methods (0.389)	Interdisciplinary knowledge utilization (0.310)
2	Cultivate pertinence (0.418)	Recruitment test questions involving multiple subjects (0.448)	Faculty interdisciplinary guidance for students (0.409)	Cross-faculty elective courses (0.302)	Interdisciplinary practice training effectiveness (0.340)	Evaluation of graduation thesis from an interdisciplinary perspective (0.289)
3	Interdisciplinary ideas (0.324)	Interprofessional admissions awareness (0.427)	Teachers' emphasis on interdisciplinary education (0.404)	The situation of interprofessional students taking professional courses (0.282)	Circumstances where interdisciplinary knowledge or methods are used (0.312)	Selected topics for interdisciplinary graduation thesis (0.256)
4				Cases where the course involves multiple disciplines (0.249)	Interdisciplinary practical training experience (0.206)	Responding experts (0.252)

postgraduates is still based on the demarcation of disciplines. The department is the unit, and the cooperation between the departments mainly involves scientific research projects and elective courses, and there is a lack of circulation and complementarity of teachers; if it is not high, students have less opportunities for interdisciplinary scientific research or practical training, and there is a large room for improvement in the topic selection of interdisciplinary graduation thesis, and the training evaluation pays less attention to the individual learning outcomes of students. In general, these are the following five problems: (1) interdisciplinary ideas lack policy support; (2) college-based ideology is more serious; (3) the sharing of educational resources needs to be promoted as a whole; (4) there is a lack of effective planning for interdisciplinary training; (5) a special evaluation system has not been established.

*4.4. Recommendations for Cross-Graduate Training.* Postgraduate interdisciplinary training is not a simple adjustment on the basis of traditional postgraduate education but a series of changes from top to bottom from concept to system to operation, which requires schools to cultivate high-level, compound top-notch innovative talents from a strategic perspective. For positioning and planning, it is necessary for the relevant departments of the school to make clear regulations on interdisciplinary admissions, training, and evaluation from the institutional level, and it also requires the cooperation of all secondary training units to negotiate and decide on specific training matters and to train them in practice. Effective resource sharing and collaborative operations are necessary for graduate education. Therefore, the interdisciplinary training of postgraduates is an overall and systematic work. The school and its functional departments, secondary units and other institutions should com-

prehensively plan the interdisciplinary training of postgraduates based on the overall situation.

The interdisciplinary concept embodied in educational activities refers to the educational concept of talent cultivation involving two or more disciplines. The degree of consensus reached by colleges and universities on this concept will affect the smooth development of their interdisciplinary educational activities and the quality of interdisciplinary talent training. The concept of interdisciplinary education needs to be widely understood by graduate teachers, graduate students, and related administrators. Acceptance and recognition, in practice, the interdisciplinary concept is deeply rooted in the hearts of the people, runs through the beginning and end of postgraduate interdisciplinary training activities, and plays a leading and supporting role in the various elements of training at each stage. First of all, colleges and universities must adhere to the concept of interdisciplinary, according to the needs of modern scientific and technological innovation and social development, gather relevant high-quality discipline resources, and strengthen the interconnection and interoperability of related disciplines in extension development and connotation construction, so as to plan and open up new directions for discipline development and give birth to disciplines. New growth points, nurturing interdisciplinary landing points are also necessary for graduate education. Secondly, under the guidance of the concept of interdisciplinary and relying on the new direction of disciplinary development, colleges and universities aim to cultivate excellent students. The top-notch innovative talents start and organize postgraduate interdisciplinary education activities, establish a matching management system and operation mechanism, and seize the commanding heights of interdisciplinary talent training. Third, in order to solidly promote the interdisciplinary training of postgraduates, colleges and universities have carried out structural

reorganization and resource innovation in the training links such as student selection, curriculum setting, teaching organization, and mentor guidance from the perspective of interdisciplinary concepts, so as to cope with the new challenges brought by interdisciplinary talent training. Finally, in order to test the quality of interdisciplinary talent training and respond to the society's demand for high-level compound talents, the quality of postgraduate interdisciplinary education is evaluated from the perspective of interdisciplinary learning outcomes.

## 5. Conclusion

By defining the constituent elements of the postgraduate interdisciplinary training model and conducting an empirical investigation on the current situation of interdisciplinary training for postgraduates in finance in universities in my country, the following conclusions can be drawn:

- (1) According to the concept of interdisciplinary education and the law of postgraduate training, postgraduate interdisciplinary training refers to the postgraduate training activities involving two or more disciplines. Management system realizes the organic integration of resources, widens the caliber of subject areas, and uses this as a supporting condition to readjust the source, composition, and relationship of each basic training link and form a new situation of talent training under the multidisciplinary background
- (2) The elements of the postgraduate interdisciplinary training model can be divided into two categories. One is the interdisciplinary supporting element, which includes four subelements of interdisciplinary concept, organizational management, cooperative institutions and subject, and areas. These elements provide interdisciplinary concepts for postgraduate training, organization, management, and resources support; the other type is postgraduate training elements, including training objectives, training process, and training evaluation three subelements, of which the training process is further subdivided into student selection, faculty, curriculum, and majors. There are four links of training and graduation thesis, and professional training includes two aspects: scientific research training and practical training. These elements constitute the main content of postgraduate interdisciplinary training and determine whether the goal of interdisciplinary education can be successfully achieved in training practice
- (3) At present, the interdisciplinary training of postgraduates in finance in colleges and universities in my country has achieved certain results, but there are still many constraints on how to further develop, deepen, and promote postgraduate interdisciplinary education: (1) the interdisciplinary concept lacks policy support; (2) college-based thinking is more serious; (3) the sharing of educational resources needs to be promoted as a whole; (4) there is no

effective plan for interdisciplinary training; (5) a special evaluation system has not been established

- (4) In order to break through the current bottleneck of interdisciplinary training of engineering postgraduates in my country, it is necessary to reform and improve in terms of interdisciplinary concepts, educational organization forms, resource sharing mechanisms, interdisciplinary training work, and quality evaluation methods

Based on the relevant theoretical concepts and methods of interdisciplinary education theory and systems science theory, this paper takes the policy texts on postgraduate interdisciplinary education in my country and the practice of interdisciplinary education at home and abroad as the objective basis, based on the sorting out of existing research and the analysis of policy documents, and proposes and defines the constituent elements of the postgraduate interdisciplinary training model, and how the interaction between these elements remains to be further studied. This paper adopts a research method that combines qualitative and quantitative analysis, but the proportion of qualitative research is relatively large, and subsequent research may consider increasing the proportion of quantitative analysis, such as using the analytic hierarchy process to construct an evaluation index system for interdisciplinary training models.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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