

# The Application of Media Integration in Ideological and Political Teaching in Colleges and Universities

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## ABSTRACT

The integrated media in teaching and political courses in colleges and universities is investigated in this study and an efficient evaluation model of quality is developed to address the challenges of media integration. Advantages and disadvantages of media integration within an educational context are identified by analyzing daily newspapers. The benefits of integrating and sharing resources between colleges and universities are highlighted, and the need for developing new education to facilitate these efforts is acknowledged. A direct value method using EM-AGA-B model entropy method is proposed as an efficient evaluation of education quality. This study contributes to the literature by a feasible plan to improve teaching quality and emphasizes the importance of media integration in education.

## KEYWORDS

BP Neural Network, Ideological and Political Teaching in Colleges and Universities, Media Integration, Teaching Quality Evaluation

## INTRODUCTION

Teaching ideological and political courses in colleges and universities has always been the focus and difficulty of college education. How to innovate the teaching mode of ideological and political courses and improve the teaching effect is the current problem to be solved urgently. Media fusion technology is one of the hot spots in the field of information technology at present. It is significant to apply media fusion technology in teaching ideological and political courses in colleges and universities to improve the quality of education and teaching. For the Internet, *fusion multimedia* (hereinafter referred to as *fusion media*) has realized the integration of traditional media, including newspapers, such as radio, television, periodicals, and the two ends of the micro (Yu, 2021). Media integration is not only the diversification of information collection channels and communication channels, but more importantly, it allows media staff to sort out comprehensively, refine, process the original materials of multimedia, convey information quickly, express the truth behind events, restore the whole picture of news, and improve the quality and depth of news reports through the characteristics of different media communication.

Through the integration of media, the audience can receive a variety of information services (Xu et al., 2022). In the context of convergent media, the interaction between people and media is

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stronger and timelier, and it has become a part of people's lives (Su & Li, 2022). For example, the information people could only get from TV, mobile phones, and computers can now be obtained from different platforms (Ji et al., 2022). With the support of the network's advantages of strong immediacy, high interactivity, and wide comprehensiveness, convergent media has the incomparable functions of the above two media (Zhai, 2022). It realizes the complementary advantages of traditional and new media in terms of resources, platforms, methods, etc., and maximizes the communication effect with the smallest cost (Huanmin, 2021). Therefore, introducing media integration into education activities can effectively stimulate the enthusiasm of students to study, the creativity of teaching, and the comprehensiveness of campus media education (Han et al., 2022).

With the rapid development of computer technology in China and the great changes in the domestic and foreign environment since the 1990s, the ideological and political courses in colleges and universities are also changing. Multimedia teaching has gradually become an important direction of ideological and political teaching reform (Li & Shi, 2021). First, ideological and political courses in colleges and universities are rich in content, comprehensive and theoretical, and have large information capacity. Secondly, modern college students have active thinking and strong receptivity. The traditional single teaching method can no longer meet the needs of students (Niu, 2020). Although media integration technology has been widely used in ideological and political teaching in colleges and universities, some problems still need to be solved. For example, the quality and quantity of multimedia teaching resources are insufficient, teachers lack sufficient understanding of the application of media integration technology, and students' ability to accept and use media integration technology is limited. These problems restrict the application and development of media integration technology in ideological and political education in colleges and universities. Therefore, how to further strengthen the application of media integration technology in college ideological and political teaching is an urgent problem to be solved.

The traditional teaching mode for ideological and political courses in colleges and universities has disadvantages, such as single teaching themes and repeated teaching forms. While enhancing the effectiveness of ideological and political teaching, it is necessary to explore new ways of ideological and political teaching, for example, media convergence, involving WeChat, Weibo, QQ, and other influential applications (Lu, 2018). Under its influence, the environment and teaching show complexity and diversity (Peng, 2020). Objectively speaking, media integration has a certain positive effect on the lack of management and purification of the information dissemination environment in colleges and universities and a negative impact on the formation of student morality (Ji et al., 2022). Therefore, this paper studies the positive role of media integration (Zhang et al., 2021) and provides theoretical reference for ideological and political teaching in colleges and universities (Feng & Dai, 2021).

In this paper, the direct value method is used in the process of genetic operation. The adaptive mutation probability is used to establish an efficient evaluation model of education quality, analyze the problems existing in the integration of multimedia, establish an effective evaluation model of education quality, and propose targeted countermeasures for the problems existing in the integrated media. Our study investigates the application of integrated media in teaching ideological and political courses in colleges and universities, a novel and important area of research. We provide a detailed analysis of the benefits and challenges of media integration and present an efficient evaluation of education quality to address these challenges. Our research thus provides a feasible plan to improve teaching quality and significantly contributes to the literature on media integration in higher education.

Accordingly, this research seeks an efficient evaluation model of education quality, which can address challenges associated with media integration in teaching ideological and political courses in colleges and universities. By the problems and limitations in multimedia integration, we aim to develop comprehensive countermeasures for improving the quality of education based on theoretical foundations. This study provides a framework for future research in media integration that can improve the quality of ideological and political teaching in colleges and universities.

## LITERATURE REVIEW

Media convergence is based on the rapid development of science and technology, with digital technology, network technology, and electronic communication technology at the core. The media form presents a new change that tends to be interactive, integrated, and even integrated. This change makes different media develop, collide, and blend in content, communication channels, and media terminals. It is increasingly changing the information space and media environment in which people live. Many studies on integrated media have been carried out in recent years. In 2019, a search for “integrated media” on CNKI showed 7,239 articles and 183 master’s and doctoral theses (Zhou, 2019). By December 2020, there were 214 master’s and doctoral theses. There is no unified view on the concept of integrated media in academic circles. Some scholars have proposed that integrated media is a multimedia system that integrates traditional and new media in terms of resources, content, publicity, utilization, and other aspects using the latest media carrier (Xu et al., 2022). Some scholars claim that “integrated media is a conceptual media with organic integration and complementary advantages of traditional media and new media” (Zhang, 2022).

Firstly, although the research results of media convergence from the perspective of communication science are limited, the perspective of communication science is very helpful for the application research of media convergence in ideological and political teaching. It can be analyzed through media characteristics, interactivity, communication effects, etc., to provide useful reference and support for integrating media into ideological and political teaching (Huang & Yang, 2022). Secondly, in the context of media integration, the communicators of ideological and political education for college students are no longer limited to educators, and college students have also become important communicators (Guo et al., 2018). College students’ autonomy and participation are increasing in ideological and political courses. Finally, the role of ideological and political teachers in ideological and political courses and their teaching ideas are closely related to the communication effect. The teaching concept also needs to keep pace with the times, constantly innovate the teaching modes of ideological and political courses, improve teaching effectiveness, and further promote the dissemination and development of ideological and political education for college students.

Some scholars have comprehensively analyzed the role of media integration in promoting information technology. It has created a broader platform, changed the educational environment, changed the form of ideological and political education for college students, improved the speed, depth, breadth, and educational effect of university content, and improved the quality of education. Media integration provides favorable conditions for optimizing the teaching environment and improving teaching methods (Rong, 2021). However, the integration of multimedia technology still has certain limitations. It is difficult to apply integrated multimedia to daily life and improve the teaching quality of the curriculum (Chen et al., 2018). Some people believe that in the context of media convergence, college students have become addicted to mobile phones and virtual worlds. The ideology of online public opinion coexists with multiple ideologies, and political systems and cultural concepts are everywhere, which also strongly challenges the original source of authority (Li, 2019). Some scholars believe that online media is full of massive and messy information, and the negative news that is encountered inadvertently easily corrodes their beliefs. In the environment of media integration, the diversity of values is obvious, and the values of college students are diversified (Li, 2021). Under the influence of these factors, the traditional ideological and political teaching has been impacted.

There are still some problems in the current research. For example, although there are many studies on the impact of media convergence on it, they remain at the level of subjective judgment and lack empirical materials (Wang et al., 2022). The degree of innovation in the research of political education approaches needs to be improved. The research on combining media integration and college students’ ideological and political education practices is insufficient, and the research field needs to be expanded. As far as the current research is concerned, it usually uses the theory of communication as the research background, and the internal relationship between it and ideological and political

education is not considered deeply enough, which leads to the study of ideological and political education of college students is limited to the field of education. The results obtained in the current research are the results of the latter research, and the deficiencies in the research will leave room for further research on media. Therefore, this paper uses a neural network algorithm and entropy method to evaluate the teaching quality, improve the application quality of fusion in daily political teaching, and improve the political literacy of college students.

It is worth noting that while there has been a significant body of work done in media integration, there remains a gap regarding its application to ideological and political courses. Furthermore, many studies involve subjective judgments and lack empirical data. To fill this gap, this study seeks to use neural networks and the entropy method to evaluate the teaching quality and improve the application quality of fusion in daily politics to enhance the political literacy of college students. Our research thus contributes to the literature on media integration and ideological teaching and provides a solid foundation for future studies.

## MATERIALS AND METHODS

This section introduces the relevant technology and theory of teaching quality evaluation, mainly including the traditional entropy method, which provides theoretical support for improving the genetic algorithm and constructing the model. We utilized a direct method and entropy method to construct an efficient evaluation model of education quality. We used data from an analysis of daily newspapers and employed the EM-AGA-BP model for our analysis. The methodology and design of our research thus represent a rigorous and comprehensive approach to the investigation of media in higher education.

### Entropy Method

Considering the complexity and relative objectivity of the undergraduate education quality evaluation system and the limitations of data collection and quantification, this paper adopts the entropy method, which is less subjective and can make full use of data characteristics. The entropy method refers to the information processing method applied in system theory. The larger the information, the more chaotic the system is, the less information it carries, and the smaller the entropy, the more orderly the system is, and the more information it carries. It is used to represent the uniformity of energy distribution in space and is represented by  $S$ .

The *entropy method* (EM) is derived from the principle of increase in thermodynamics in physics: there is a state function. That is, the increase of the independent system must rely on the irreversible process, and the reversible process will not change the independent system. Shannon applied the concept of directness to information theory, and the increase or decrease of information directness can be used to measure the activity process that leads to the increase or decrease of the certainty, organization, regularity, or order of the random event state set. The calculation formula of the information descendant is shown in Equation 1:

$$H_S = (p_1, \dots, p_N) = -K \sum_{i=1}^N p_i \log p_i \quad (1)$$

Simply put, the smaller the information descendant. The direct value not only has a theoretical basis but also has higher accuracy and credibility than the subjective weighting method. In addition, the algorithm is relatively simple, and it is more convenient to operate in practice. It is based on data can overcome the randomness and subjectivity that cannot be avoided by the subjective weighting method.

## Genetic Algorithms

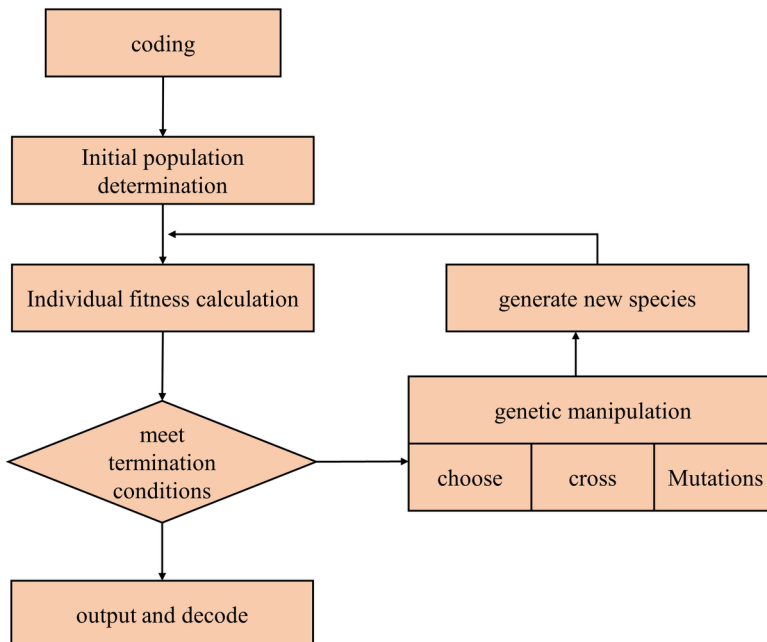
A *genetic algorithm* is an optimization algorithm that simulates the natural evolution process. It simulates the genetic, crossover, and mutation of genes and other biological evolution processes. The candidate solution is encoded as a set of binary strings called *chromosomes*. These chromosomes are combined into a *population*; that is, a group of candidate solutions. In the recombination process, the best chromosome is selected to cross to achieve a better solution. At the same time, the mutation operation is occasionally carried out, that is, adding new bits and segments to the chromosome structure to replace the original part, increasing the population's diversity and the breadth of search space. Through continuous iteration, the genetic algorithm can gradually optimize the chromosomes in the population to obtain the optimal solution. The flowchart of the standard genetic algorithm is shown in Figure 1.

A genetic algorithm is used to determine the initial parameters of the optimal network. It generates multiple starting points randomly for parallel optimization and determines the optimization direction by a fitness function. Based on selection, crossover, and mutation operations, adaptive and fast parameter optimization in high-dimensional space is realized.

## BP Neural Network

The BP (backpropagation) neural network was proposed by scientists led by Rumelhart and McClelland in 1986. BP neural network is a multi-layer feedforward network trained according to error backpropagation. Its basic idea is the gradient descent method, which uses gradient search technology to minimize the error mean square error between the actual output value and the expected output value of the network. A BP neural network mainly includes an input layer, a hidden layer, and an output layer. The hidden layer design of a neural network can approach a nonlinear function with some precision, to obtain a relatively more accurate output. The working process of BP neural network is as follows.

Figure 1. Flow chart of standard genetic algorithm



The output of the  $i$ th neuron in the hidden layer, as shown in Equation 2:

$$a1_i = f1(w1_{ij} p_j + b1_i), (i = 1, 2, \dots, r) \quad (2)$$

The output of the  $k$ th neuron in the output layer, as shown in Equation 3:

$$a2_k = f2\left(\sum_{i=1}^{s1} w2_{ki} a1_i + b2_k\right), (k = 1, 2, \dots, s1) \quad (3)$$

Define the error function, as shown in Equation 4:

$$E(W, B) = \frac{1}{2} \sum_{k=1}^{s2} (t_k - a2_k)^2 \quad (4)$$

The weights of the output layer change to the weights in Equation 5:

$$\Delta w2_{ki} = \eta \frac{\partial E}{\partial w2_{ki}} = -\eta \frac{\partial E}{\partial a2_k} \times \frac{\partial a2_k}{\partial w2_{ki}} \quad (5)$$

The expressions of  $\delta_{ki}$  and  $e_k$  are shown in Equations 6–7:

$$\delta_{ki} = (t_k - a2_k) f1' = e_k f2' \quad (6)$$

$$e_k = t_k - a2_k \quad (7)$$

In the same way, the expression of  $\Delta b2$  can be obtained, as shown in Equation 8:

$$\Delta b2_{ki} = -\eta \frac{\partial E}{\partial b2_{ki}} = -\eta \frac{\partial E}{\partial a2_k} \times \frac{\partial a2_k}{\partial b2_{ki}} = \eta (t_k - a2_k) f2' = \eta \delta_{ki} \quad (8)$$

$$\Delta w1_{ki} = -\eta \frac{\partial E}{\partial w1_{ki}} = -\eta \frac{\partial E}{\partial a2_k} \times \frac{\partial a2_k}{\partial a1_i} \times \frac{\partial a1_i}{\partial w1_{ki}} \quad (9)$$

In the same way,  $\Delta b1$ , the expression can be obtained, as shown in Equation 10:

$$\Delta b1_i = \eta_{ij} \quad (10)$$

### Adaptive Mutation Genetic Algorithm

In order to improve the convergence performance of the genetic algorithm, this paper proposes an adaptive mutation genetic algorithm. Mutation operation is one of the main operations of a genetic algorithm. However, in the operation process of a standard genetic algorithm, selecting a larger mutation probability will become a random search, and selecting a smaller mutation probability will not easily escape the local extreme point. Therefore, it is very important to design adaptive mutation operations. In the mutation operation, each bit in the coding string is randomly changed with a certain probability, but the change of different coding bits causes different changes in individual fitness; that is, the importance of each coding bit is not equal. The mutation probability  $P$  in this paper is shown in Equation 11:

$$P = (P_1 + P_2) / 2 = (P_0 - (P_0 - P_{\min}) * m / M + P_0 * \max_{x_K \in \Omega} F(X_K) / \bar{F}) / 2 \tag{11}$$

### AGA-BP Model

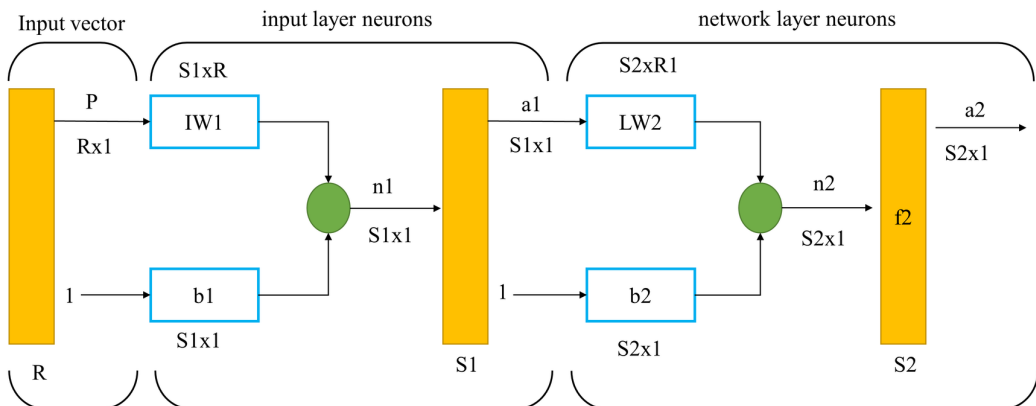
A BP neural network is a kind of multilayer feedforward neural network, which has strong nonlinear mapping ability and flexible network structure but also has the defect of easily falling into local minimum. In addition, the traditional BP neural network also has the problems of unstable network structure: The selection of initial connection weights and thresholds greatly impacts network training, but it cannot be accurately obtained. Therefore, many scholars use genetic algorithm (GA) to optimize a BP neural network. However, compared with a genetic algorithm, an *adaptive genetic algorithm* has better convergence accuracy, speed, and global optimization ability. Therefore, the AGA can be used to optimize the BP neural network.

The specific modeling process of AGA-BP neural network is shown in Equations 12–15. The performance of the multi-hidden-layer neural network vector model used in this paper in MATLAB as shown in Figure 2:

$$m = \sqrt{n + 1} + a \tag{12}$$

$$m = \log 2^n \tag{13}$$

Figure 2. Vector model of multi-layer neural network in MATLAB



$$m = \sqrt{nl} \tag{14}$$

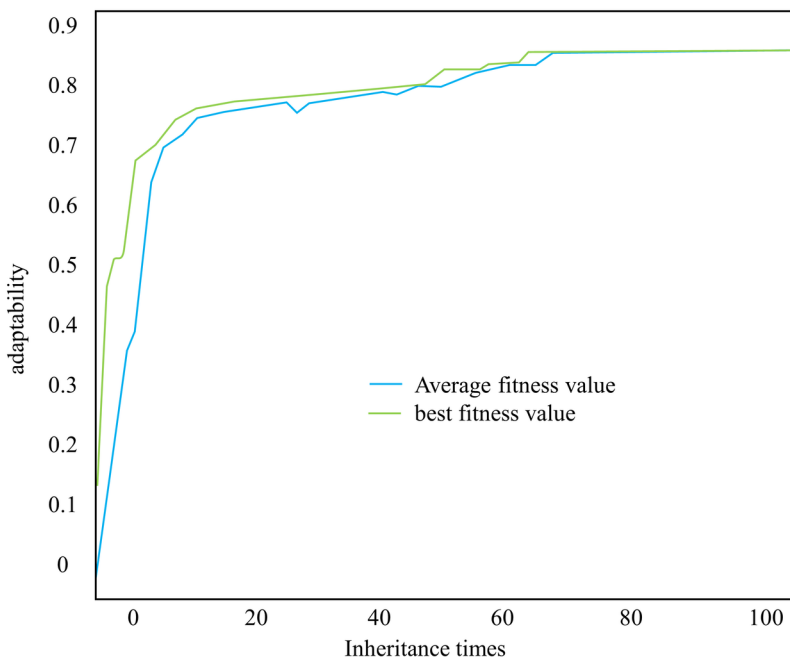
$$f(x) = \frac{1}{1 + e^x} \tag{15}$$

## RESULTS AND DISCUSSION

Because the threshold and weight values between the input layer and the hidden layer and between the output layer and the hidden layer are randomly generated during the training of the BP neural network, resulting in too many training times, and the genetic algorithm is easy to fall into the local optimal situation during the global search. Therefore, a BP neural network model based on the improved adaptive genetic algorithm is proposed to search for the optimal solution of the weight and threshold of the BP neural network. Through Matlab2013b, the simulation experiment of Figure 3 shows that the average fitness and optimal fitness converge faster before the 20th generation, and the 40–60th generations converge slowly, reaching a stable state after 67 iterations, and the fitness value finally stabilized at 0.84.

Further comparing the GA-BPNN error sum of squares and the adaptive variation of the GA-BPNN error sum of squares, the GA-BPNN error sum of squares and the minimum error sum of squares converge very quickly before the 10th generation. The convergence rate is slower by the 25th generation and finally converges at the 25th iteration, and the error sum of squares stabilizes at about 0.9. The adaptive mutation GA-BPNN converges after only six iterations, the error sum of the network reaches a stable level, the error sum of squares converges to 0.19, the convergence speed is

Figure 3. The genetic algorithm optimizes the fitness of the BP neural network





increased by 76%, and the sum of squares is reduced by 79%. After adaptive mutation, the BPNN can quickly achieve global optimization. From Figure 4, the algorithm proposed in this paper can concentrate resources, integrate content, and effectively use financial media to effectively spread two-way efficient ideological and political daily better absorb the content of a class.

According to the error comparison data in Figure 4, the BP neural network optimized by a genetic algorithm can improve the prediction accuracy to a certain extent, but the traditional genetic algorithm will have a locally optimal solution in the process of searching for the optimal solution. Given the above problems, a BP neural network teaching quality evaluation model for ideological and political courses based on improved adaptive genetic algorithm optimization is proposed. Not only does the set adaptive function converge faster but also the prediction error is greatly reduced compared with the traditional method, as shown in Figures 5–7. According to the research and measured data, it can be concluded that the prediction error of the BP neural network model optimized based on an improved genetic algorithm is the smallest, which is superior to the single BP neural network prediction model and the BP neural network prediction model optimized based on traditional genetic algorithm.

We reviewed the benefits of media integration in teaching ideological political courses in higher education, including the advantages of promoting culture and the challenges of developing an efficient teaching evaluation model. We developed a direct value method using the EM-AGA-BP model and entropy method to construct an efficient evaluation of the education quality model. The test and analysis section of this research further established the key components of the teaching model, providing useful data for teaching practices. However, it identified that there is still room for in-depth research, particularly in areas such as promoting media integration and how to use media to innovate efficient education models.

The scope of our study has limitations, and further research be conducted to address these limitations. Specifically, our study used an improved adaptive genetic algorithm combined with a BP network to optimize the evaluation of teaching quality in ideological and political courses.

Figure 4. Genetic algorithm optimizes BP neural network error sum of squares

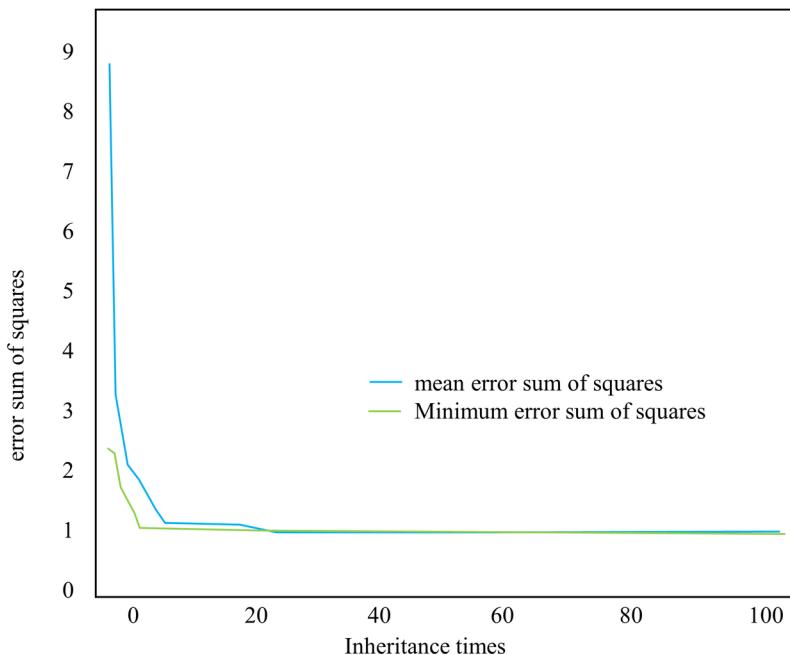


Figure 5. Prediction result of BP neural network model optimized by genetic algorithm

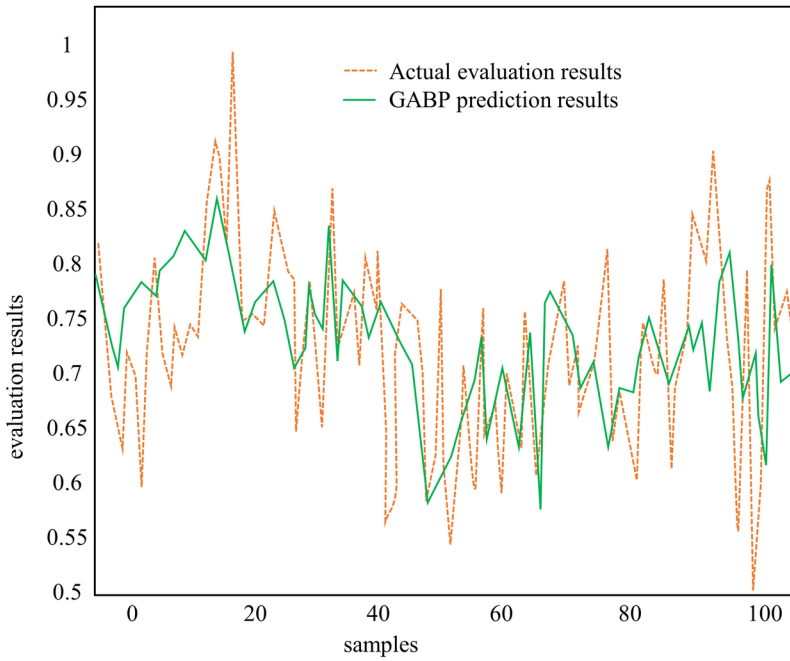


Figure 6. Prediction results of the improved genetic algorithm to optimize the BP neural network model

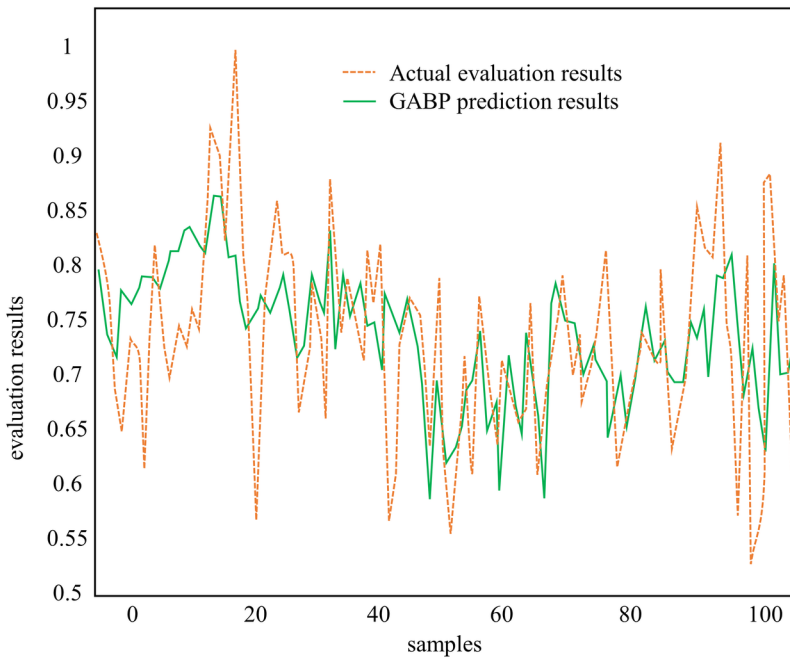
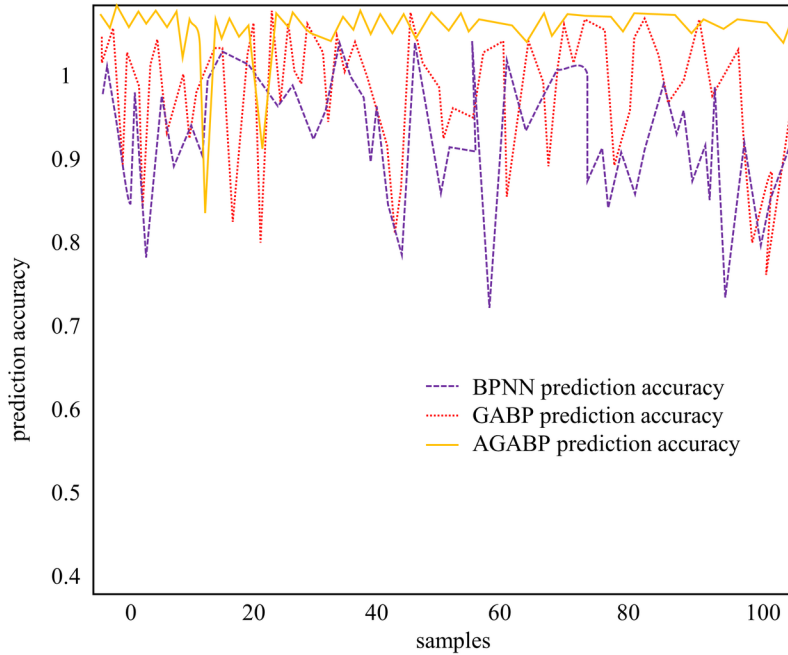


Figure 7. Comparison of the prediction accuracy of the three models



However, there is a possibility that other optimization algorithms, such as particle swarm optimization or optimization, could be utilized further to improve the performance of the BP neural network in evaluating teaching quality. The data used in our study were solely collected from financial media sources and were limited to the application of media integration in ideological and political teaching within the context of Chinese colleges and universities. research can expand the scope of data collection to other media sources, cultural contexts, and countries, providing a more comprehensive understanding of the use of media integration in teaching. The findings of our study show the potential of using an improved adaptive genetic algorithm to optimize the evaluation of teaching quality in ideological political courses. Our results showed that the adaptive genetic algorithm approach was more effective than both the genetic algorithm and the single BP neural method in improving the accuracy of predictions. This suggests that an improved adaptive genetic algorithm has significant implications for developing more accurate and effective evaluation models for ideological and political teaching.

## CONCLUSION

In the context of media integration, this study used the direct value method (EM-AGA-BP model) to establish an effective evaluation model of education quality and put forward targeted countermeasures against the problems of integrated media. The results show that the BP neural network education quality evaluation model based on the improved adaptive genetic algorithm optimization proposed in this paper not only has a fast convergence speed of the set adaptive function but also greatly reduces the prediction error compared with the traditional method. This study used a BP neural network and adaptive mutation probability to optimize the teaching quality evaluation model, which provides useful theoretical guidance for ideological and political teaching in colleges and universities. The results have several important implications for educational practice and further research. First, media integration is a viable approach to improving the quality of teaching in ideological and political courses

in colleges and universities, and second, our evaluation model can be used to assess the quality of teaching across other subject domains. Future research should investigate how different media formats and education can be leveraged to improve educational outcomes.

### **DATA AVAILABILITY**

The figures used to support the findings of this study are included in the article.

### **CONFLICTS OF INTEREST**

The authors declare that they have no conflicts of interest.

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