




Transforming College Students' Ideological and Political Education Through Distributed Technology in the Digital Age of Network Public Opinion

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Abstract. Internet public opinion is the product of the development of science and technology in human society. College students begin to "open their eyes to the world" through the Internet and use it freely in a short time. As the leader of ideological and political education in colleges and universities, the teacher of ideological and political theory course is one of the key factors in ideological and political education activities. Without educators, there will be no organizers and implementers of ideological and political education activities, and the educational objects will lack necessary guidance and encouragement in the process of development. However, the teachers of ideological and political courses are far behind the students in terms of familiarity and application of the Internet, except that they are a little more careful in thinking about problems and divergent in problems. This paper studies the collaborative education of college students' ideological and political education from the perspective of network public opinion. Its theoretical significance is to incorporate the collaborative education of college students' ideological and political education from the perspective of Digital Age into the network platform on the basis of network public opinion.

Keywords: Internet public opinion; Ideological and political education for college students; Collaborative education; distributed technology; Digital Age

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1 INTRODUCTION

Internet public opinion is the product of the development of science and technology in human society. With the popularization of the Internet and the rise of the global Internet, the Internet media has become the fourth largest media after television, radio and newspapers, and the new term

Internet public opinion has emerged as the times require. Internet public opinion refers to the cognition, willingness, attitude, emotion and behavior tendency of an individual, the public or a group to an event and hot spot on the Internet [19]. With the carrier of the Internet, online public opinion has incomparable advantages over traditional online media. The social influence of network public opinion is becoming more and more obvious, and its influence on college students' ideological and political education is becoming more and more obvious [15]. Enriched the research content of ideological and political education. Network public opinion has two influences on college students' ideological and political education: on the one hand, network public opinion has become a new front for college students' ideological and political education. On the other hand, the negative impact of negative online public opinion adds a new topic to theoretical research. In order to maintain the security and stability of college campus. On the one hand, we can use positive values to guide online public opinion. On the other hand, we can find bad and negative online public opinion as soon as possible, reduce the probability of vicious online public opinion events or crises, and realize the harmonious and stable development of colleges and universities [9][12]. The guidance of public opinion is an important task in the traditional public opinion work, and how to guide the existing hot public opinion in the real society and network is a very important subject [1]. Due to the fact that such public opinion events can't be reproduced and can't be repeated, and the traditional social psychology experiment can't guarantee the large sample size and accuracy. Digital age can enhance college students' understanding of ideological and political concepts in a digitally interconnected world.

As the leader of ideological and political education in colleges and universities, the teacher of ideological and political theory course is one of the key factors in ideological and political education activities. Without educators, there would be no organizers and implementers of ideological and political education activities, and the educational objects would lack necessary guidance and encouragement in the process of development [3]. Thus, teachers will certainly interfere with students' "learning" when they "teach" students. Therefore, if the teachers' ability of ideological and political course is not up to standard, college students will not be able to acquire the corresponding knowledge and experience in ideological and political course [6]. However, the richness, suddenness and uncontrollability of online public opinion pose new challenges to ideological and political workers. Stubborn book research has been quietly replaced among college students, and college students begin to "open their eyes to the world" through the Internet and apply it freely in a short time. However, ideological and political teachers are far behind students in terms of familiarity and application of the Internet, except that they are slightly superior in thinking and divergence of problems [17]. Under the great impact of bad network public opinion information and some western ideologies on college students' thoughts and behaviors, college students' ideological and political educators should deeply understand that they must cultivate college students' correct values and maintain the leading position of Marxism in college students' ideological field through indoctrination. At the same time, educators should make full use of college students' favorite network as a carrier to carry out infiltration education, entertaining and entertaining, and carry out ideological and political education for college students in a subtle way [8]. Internet public opinion is a "double-edged sword". Internet public opinion has become a new carrier for college students to express their emotions and opinions, helping ideological and political educators to understand the ideological situation of college students and judge their dynamic development. At the same time, it also has a negative impact on college students' ideological and political education [10]. Therefore, under the social background of the era of big data, taking online public opinion as a breakthrough point, analyzing its dual influences on college students' ideological and political education, and exploring the positive significance of online public opinion on the cooperative education of college students' ideological and political education have become new topics discussed in this paper. Therefore, in the view of network public opinion, we should organically unify the two, so as to effectively realize the goal of moral education for college students. Based on this, this paper studies the collaborative

education of college students' ideological and political education from the perspective of network public opinion. Its theoretical significance is to bring the collaborative education of ideological and political education into the network public opinion platform on the basis of network public opinion, and points out the role of network public opinion platform in promoting the education of college students' ideological and political education. Through the research on the collaborative education of college students' ideological and political education from the perspective of online public opinion, it is concluded that the construction of online public opinion platform plays a decisive role, and the influence of online public opinion platform on the collaborative education of college students' ideological and political education can be further enhanced by learning, absorbing and digesting the technology of traditional platform.

Starting from the relevant research on the collaborative education of College Students' Ideological and political education from the perspective of network public opinion, this paper makes an in-depth analysis based on the perspective of network public opinion. The structure is as follows: the first section is the introduction. This part mainly expounds the background and research significance of collaborative education of Ideological and political education of college students from the perspective of network public opinion, and puts forward the research purpose, methods and innovation of this paper. The second section mainly summarizes the literature related to online public opinion, summarizes its advantages and disadvantages, and puts forward the research ideas of this paper. The third section is the method part, which focuses on the construction of a network public opinion platform for collaborative education of College Students' Ideological and political education. The fourth section is the experimental analysis. This part carries out experimental verification in the data set, and analyzes the relevant data after building a network public opinion platform for collaborative education of Ideological and political education for college students.

2 RELATED WORK

As for public opinion and online public opinion, this is a naming method with Chinese characteristics. Because of the different national conditions, cultural environment and political systems, some scholars focus on theoretical exploration, while some scholars focus on the practical level, and are more willing to go into life to understand and experience. The research related to network public opinion mainly focuses on the Internet as a new media form, which plays a role in reflecting social conditions, public opinion and other public things. Network public opinion does not appear in a new form of public opinion. This paper expounds the influence of network public opinion on ethics and morality from the aspects of the development of moral values of information, the establishment of new moral rights in the field of information, and the development of moral conflicts in the field of information. Among them, the dissemination of network information will threaten others' privacy and secrets, resulting in the anomie of information content. Generally speaking, the research on public opinion and online public opinion mainly focuses on the following contents: Chenhai maintains the harmony and tranquility of the campus by improving the supervision mode of online public opinion. As a dynamic reflection of changes at all times, ideological and political workers can quickly and efficiently guide college students to walk on the right path by monitoring its changes in real time and making targeted adjustment countermeasures. At the same time, ideological and political workers can take network public opinion as a carrier to teach college students how to correctly regulate their words and deeds, how to cultivate a correct world outlook, outlook on life and values, which are of great practical significance to the maintenance of the campus. Relevant scholars expressed concern about the impact of online public opinion on the public [13]. Wang Qi said, "in the Internet, network public opinion plays the role of a magnifying glass, magnifying and disseminating extreme and even distorted views in the virtual world. Negative information spreads in society and acts on real life, which will mislead the people and distort public opinion. When negative effects spread in social real life, they will affect the formation of correct values of the public

and hinder the practice of rational behavior of the public [16]。 Gao Yi believes that in the process of managing online public opinion according to law, supervision should be combined with administrative management, science and technology, and economic means to achieve the effect of collaborative management. The technical supervision of network public opinion mainly puts forward that network public opinion is the collection of cognition, emotion and opinions expressed on social hot spots and hot events on the network through technical means such as data encryption, real name authentication and prevention. It also believes that network public opinion refers to the sum of the attitudes, emotions and opinions expressed by the network audience around social hot spots or specific topics through network language and other ways of network use under the network vision [7]. Fire wall filtration and other forms [4]. Li Jun believes that Internet public opinion is stimulated by a specific event, which makes people express their analytical cognition of the event on the Internet, express their attitudes and positions, and spread rapidly. Through the Internet, college students' choice of educational content has greatly increased, the ways of information acquisition and transmission have become richer, the dominance of Ideological and political workers in content has disappeared, and the status of college students in Ideological and political education has also been significantly improved. For the traditional ideological and political education of college students, he Huining only pays attention to the surface and the feelings of Ideological and political workers, and believes that the educational concept that ignores the actual needs and inner aspirations of college students must be changed [5]. From the perspective of the characteristics and development law of network public opinion, Bowman Na elaborated on the opportunities and challenges brought by network public opinion to the ideological and political education work, and proposed that the development of Ideological and political education work from the perspective of network public opinion should be carried out from three aspects: optimizing educational content, innovating educational means, and improving the comprehensive quality of educators [2].

To sum up, from the current research literature, the research methods focus on emergencies and crisis situations. At the same time, the response subjects are generally government departments, enterprises and mainstream media, which has certain limitations for network subjects. Moreover, in terms of journal papers, scholars have recognized the importance of the combination of online public opinion and ideological and political education, but the research results are lack, and the issues concerned are not comprehensive enough to form a scientific and systematic theoretical system. Therefore, it is imperative to strengthen the research on the ideological and political education of college students from the perspective of network public opinion. Based on this, this paper proposes to build a network public opinion platform for the collaborative education of College Students' Ideological and political education. Through the construction of the network public opinion platform, we can achieve the effect of the common development of network public opinion and ideological and political education, which is of great help to the improvement of College Students' ideological quality.

3 METHODOLOGY

3.1 Overview of Internet Public Opinion

The word "public opinion" has a long history. It first appeared in Old Tang Book, and then it was frequently used. Its connotation is constantly enriched with the development of the times. Generally speaking, the dictionary interprets public opinion as people's opinions and attitudes. However, this kind of understanding is a little thin, and it doesn't really reflect the inherent essence and unique characteristics of public opinion. In recent years, scholars have defined public opinion from many angles, but at present, the academic community has not reached a consensus [20]. Public events are more complicated and changeable. Once the network public opinion is formed, it will be in constant development and change, but it is not a straight-line upward or downward movement, but a tortuous development process with the wave-like changes of public opinion factors such as the

information. Netizens can interact with each other through the network platform. When netizens follow up and comment on hot events, they have strong subjectivity and randomness, and their sensibility is more than their rationality. Internet public opinion is often irrational, which is mainly reflected in two aspects: on the one hand, it tends to be negative. As a free and open platform, the Internet broadens people's activity space and becomes an important way for people to express their interests and vent their feelings. With the rapid development of the Internet, the carrier and transmission of network public opinion are virtual electronic space, not real physical space.

Public events are more complicated and changeable. Once the network public opinion is formed, it will also be in constant development and change, but it is not a straight-line upward or downward movement, but a tortuous development process with the wave-like changes of public opinion factors such as the attitude and handling methods of the government and the attitude of netizens. That is, after the network public opinion reaches its climax, it will enter a shrinking or silent stage. However, due to other incentives, there may be a new climax, and it has repeated characteristics. Internet public opinion has changed from irrational to rational in the process of evolution. Internet public opinion often shows some irrationality at the beginning. However, with the development of intermediary social matters, online public opinion will gradually turn from irrational to rational. When there is just a hot event on the Internet, netizens tend to take it as a way to vent their emotions, and follow, comment and reprint it without thinking. Sensibility is greater than rationality.

3.2 Collaborative Education of College Students' Ideological and Political Education From the Perspective of Network Public Opinion

College students are in a critical period of growth, and are easily influenced by the external objective environment. When college students are faced with complex and diverse network public opinions, they will have various reactions. Even in the face of the same network public opinion, college students' ideological direction will be deviated. Among them, positive online public opinion will guide the healthy development of college students' thoughts, but negative online public opinion will mislead college students, and even lead to extreme thoughts and behaviors. Different from the traditional media, online public opinion changes from static one-way to dynamic two-way information dissemination, and its advantages are embodied in interactivity and timeliness. Under the influence of network public opinion, ideological and political educators should change the traditional single and "cramming" teaching methods in the past. Because boring theoretical knowledge and uninspiring single teaching method can't meet the needs of curious and active college students, it can't really internalize the educational content into college students' ideology. At the same time, traditional education methods make it difficult for educators to get accurate feedback on college students' learning situation. Therefore, educators should keep pace with the times, change the traditional teaching methods, communicate and interact with students equally with the help of the interactive characteristics of online public opinion, actively share and discuss the teaching content with students, and further understand the actual needs of students. Compared with the traditional ideological and political education combined with the Internet, the most prominent difference lies in the educational content itself. Traditional ideological and political education relies on books and other paper media to show the educational content, with a single form, insufficient carriers and insufficient innovation. At the same time, the timeliness of the content is poor, and the lag is serious. Ideological and political workers don't have many ideas on teaching the content, and there is little room for change. However, the network ideological and political education has got rid of the shackles of books, and great changes have taken place in the educational content. In order to enable college students to gain more theoretical knowledge and practical experience in the ideological and political education, ideological and political workers take the initiative to combine boring educational content with vivid network pictures, videos, and moving pictures, so that the plane information becomes three-dimensional and boring content becomes vivid. As a result, the attention of network ideological and

political education among college students has gradually increased, and its radiation has gradually increased.

College students can receive information timely and effectively through Internet public opinion and carry out self-education. At the same time, network public opinion has the characteristics of large amount of information and strong resource sharing. With the help of network carriers, college students can express their views and attitudes towards a certain event anytime and anywhere. Educators can timely find out the bad ideological trends of college students and effectively guide and educate college students by collecting, analyzing and studying public opinion information. Internet public opinion will affect the moral personality cultivation of "Internet people", and ideological and political education in Colleges and universities also happens to be the guidance of students' morality, thought, personality and values. It is a manifestation of low moral quality and immaturity for college students to publish remarks wantonly on the Internet and spread their subjective assumptions and guesses. In the daily ideological and political education, it will play a good mapping role to cultivate students' healthy personality and Cultivation in life and improve their ideological and moral sentiment. The resources of Ideological and political education refer to the sum of various elements that can be developed and utilized by educators and promote the realization of the purpose of Ideological and political education in the process of Ideological and political education.

3.3 Build a Network Public Opinion Platform for the Collaborative Education of College Students' Ideological and Political Education

The basic principle of the system to be realized this time is to collect, process and then mine the data of the information in the webpage. Before data mining, information should be preprocessed, such as webpage purification, word segmentation, word frequency statistics, feature selection and feature extraction. The most basic elements in a society are points and connections, in which points represent users or actors, and connections represent relationships or connections between actors. To build a social network, it is first necessary to determine the social actors of nodes and the connections between nodes. In the prediction of public opinion trend, we randomly set weights and thresholds. Given the processed public opinion information and the expected prediction results as inputs, the BP neural network begins to learn and train until the prediction error is within the acceptance range or exceeds the limit of learning times. After such trained public opinion information and expected prediction results, the model can be used to predict the trend of similar public opinion information. The flow chart of forecasting public opinion trend is shown in Figure 2.

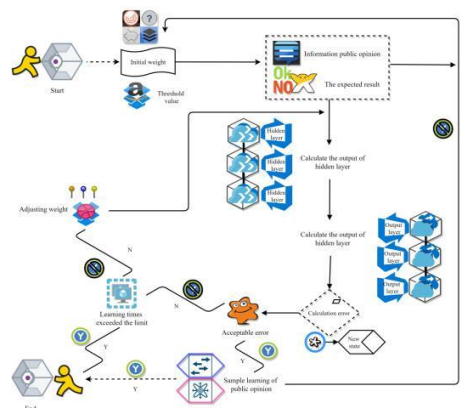


Figure 2: The flow chart of public opinion trend prediction.

In order to describe the topological index of public opinion network, the overall network scale includes two aspects: the number of nodes and the number of edges. Network density refers to the average degree of mutual communication between nodes in the public opinion network structure, and refers to the ratio of the actual number of links in this network divided by the largest number of possible links. In the actual public opinion network, the lower the network density, the less frequent the communication between nodes, and the more difficult it is to spread public opinion. The social density of the network can represent the closeness of communication, the frequency of interaction and the transmission rate of information in the public opinion network.

$$d = \frac{|E|}{|V|(|V|-1)} \quad (1)$$

The average network distance Z refers to the average of the shortest path lengths between all nodes in the network. In a network composed of n nodes, the shortest distance from the i th node to the j th node is defined as the minimum number of edges from the node to the node, and this distance is the shortest path. Therefore, the shortest path average of all nodes in the whole network is the average of all nodes in the network. In the actual public opinion network, the shorter the average shortest distance of the network, the faster the information spread between nodes and the more frequent the communication.

$$\bar{L} = \frac{1}{|V|} \sum_i^{|V|} L_{\min}(i) \quad (2)$$

In order to facilitate data processing and speed up convergence, the data are normalized so that the values of input and output data are within 0~1. The formula of normalization is as follows: □

$$Y = \frac{X - X_{\min}}{X_{\max} - X_{\min}} \quad (3)$$

In the actual public opinion network, the degree centrality measures the communication ability of the actors in the public opinion network. In directed nets, degree centrality is divided into in-degree and out-degree. Because in the forwarding network, the forwarded can better represent the importance of the node than the forwarding. "Structural hole" refers to the hole that occurs when there is no direct relationship or lack of relationship between nodes in the network. It is based on the degree centrality of nodes. A further description of the extent to which the node controls the resource. As shown in Figure 3 below:

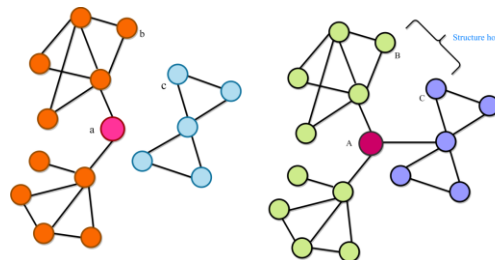


Figure 3: Structural hole structure diagram.

The indicators based on the measurement of structural holes include effective scale, efficiency, restriction and grade. Since the four indicators have very similar characterization results for structural holes, this paper uses the effective scale among them as the index of structural hole measurement. The effective scale refers to the scale of the individual network minus the redundancy of the network, and the effective scale is equal to the non-redundant factors in the network. The specific formula is as follows:

$$Effsize_i = \sum_j \left(1 - \sum_q P_{iq} m_{jp} \right) \quad q \neq i, j \quad (4)$$

Because of the mutual direction of web links in the network, the PR value of one web page is always determined recursively by the PR values of other web pages, and any web page has an impact on the PR values of other web pages. The calculation of this score is an iterative process, and finally the web pages are searched and sorted according to the obtained score. The mathematical expression of PR value allocation process is as follows:

$$PR(A) = (1-d) + d * \left(\frac{PR(T_1)}{C(T_1)} + \frac{PR(T_2)}{C(T_2)} \dots + \frac{PR(T_n)}{C(T_n)} \right) \quad (5)$$

There is a similar topological structure between the forwarding network and the network link network, and the forwarding behavior also has the link direction. PageRank algorithm can be used to calculate and sort the authoritative PR values of users. Among them, PR value can be used as an important indicator of whether users are influential key nodes. The improved PagePank algorithm based on forwarding network is expressed as follows:

$$WR(A') = (1-d) + d * \sum_{i=1, T_i \neq A}^N Weight(T_i', A) * WR(T_i') \quad (6)$$

There are some differences between user forwarding network and web link, so it is necessary to improve the traditional PageRank algorithm according to the characteristics of user forwarding network. There is only one link relationship with a web page in a single direction, but the link relationship of users' forwarding behavior is more complicated. Besides considering the direction of the link relationship, there should also be Weight data which reflects the interaction frequency. In the actual public opinion network, the absolute and relative expressions of the degree centrality calculation are:

$$k_1(i) = e(i) \quad (7)$$

$$k_1'(i) = \frac{k_1(i)}{|V|-1} \quad (8)$$

The absolute formula and relative formula for the calculation of closeness degree are:

$$k_2(i) = \left[\sum_{j=1}^{|V|} e(i, j) \right]^{-1} \quad (9)$$

$$k_2'(i) = \frac{k_2(i)}{|V|-1} \quad (10)$$

The absolute and relative formulas for calculating the center degree are:

$$k_3(i) = \sum_{j < k} g_{jk}(i) / g_{jk} \quad (10)$$

$$k_3'(i) = \frac{k_3(i)}{0.5[(|V|-1)(|V|-2)]} \quad (11)$$

As the development of public opinion events always goes through a period of time, the public opinion social network added to the time dimension refers to the public opinion social network formed by the expression and communication of users' emotions, attitudes, wishes and opinions within the evolution range (time period) of the formation, diffusion, outbreak and termination of public opinion evolution in turn.

4 RESULTS AND ANALYSIS

Through the survey and statistics of the hot topics of college students' online public opinion, the sample data comes from the topic interface of the API, and the amount of discussion on social news hot topics is read. In the experiment, a 3-layer BP neural network is selected, the number of neurons in the input layer is 4, the number of neurons in the hidden layer is 15, and the number of neurons in the output layer is 1. Other parameter settings are shown in Table 1.

Combined with optimization algorithm		Standard BP algorithm
Population size: 20	Population boundaries: [-3, 3]	Weight initial assignment interval [-2, 2]
Crossover probability: 0.4	Mutation probability: 0.3	Learning rate: 0.2
Initial temperature: 300	Cooling factor: 0.2	Threshold initial assignment interval [-2, 2]

Table 1: Experimental parameter settings.

Take the number 1-5 as the training set, input the discussion volume, predict the future discussion volume, compare it with the real data, and calculate the error rate when using the standard BP and combined optimization algorithm to predict the trend of public opinion. The results are shown in Table 2.

Topic	Actual value	Standard BP Algorithm Predicted Value	Error rate	Combined with the predicted value of the optimization algorithm	Error rate
1. Tunnel accident	1154821	1642584	0.41	1431528	0.21

2. Huawei's new car	584512	845421	0.48	756859	0.25
3. The best graduating class	551215	745121	0.43	658945	0.24
4. You can drop a maximum of 65 points in the Tsinghua exam	412542	593321	0.51	524104	0.28
5. Ele.me event	245821	374548	0.44	321584	0.32

Table 2: Results.

The public opinion trend prediction result of the neural network optimized by the genetic algorithm and simulated annealing algorithm is far closer to the real value than the prediction of the standard BP neural network. The comparison between the output value and the sample value is shown in Figure 4.

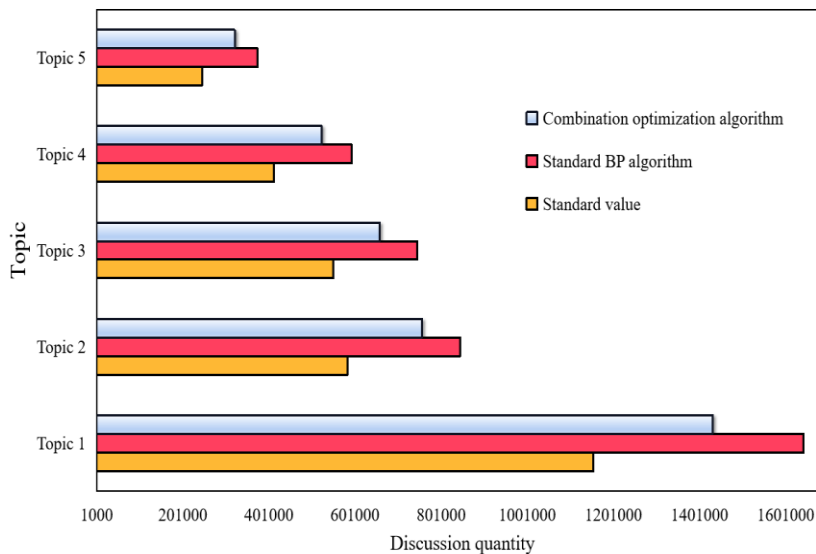


Figure 4: Comparison of output value and sample value.

It can be seen from Figure 4 that the combination of optimization algorithms is of great help in improving the accuracy of public opinion trend prediction. We can know that the general trend of increasing the number of edges in the network is relatively stable compared with that of the nodes. In order to study the average increase of the number of edges per node over time, it is shown in Figure 5.

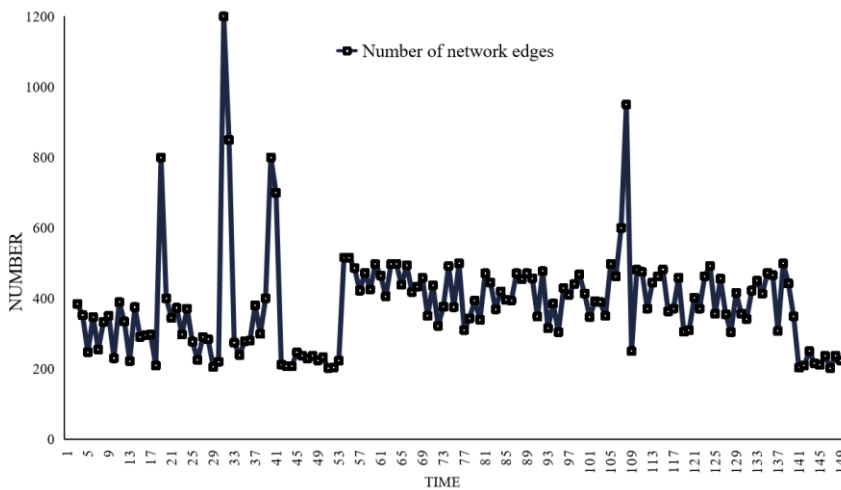


Figure 5: The average number of added edges per node varies with time.

The average number of edges added to each node in the network fluctuates greatly. Although we define it from the scale-free network construction algorithm, it has an average meaning, but we still need to further study the change of the average degree of the network over time, such as shown in Figure 6.

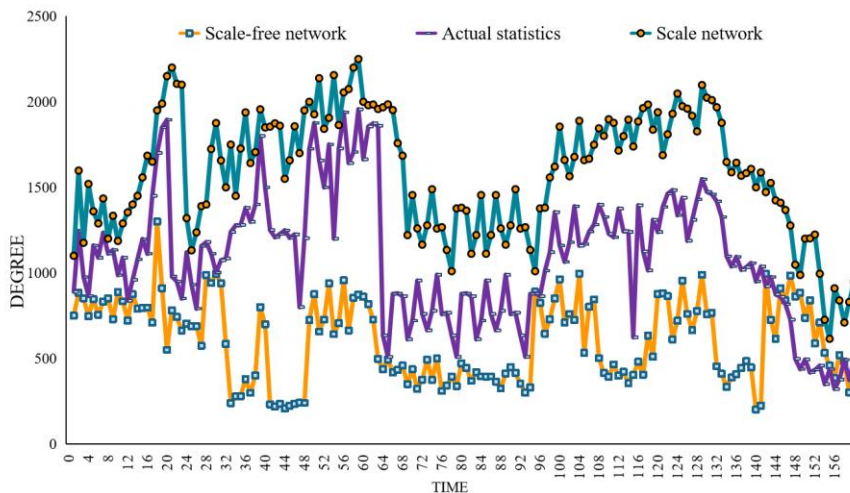


Figure 6: The average degree of the network as a function of time.

From Figure 6, we can see that the simulation results are different from the typical scale-free network, and are also in good agreement with the actual statistical results. In order to further study the influence of online public opinion and college students' ideological and political education, PageRank algorithm is used to calculate and sort the authoritative PR values of users. The comparison result of PR value as an important indicator of key nodes with influence of users is shown in Figure 7.

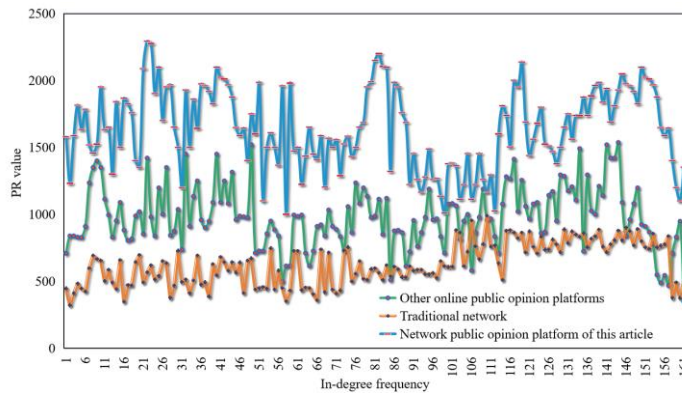


Figure 7: Comparison of PR values for different in-degree frequencies.

In order to deeply study the influence of the platform in this paper on the collaborative education of college students' ideological and political education, the activity of different online public opinion events was tracked, and the comparison results of their activity are shown in Figure 8.

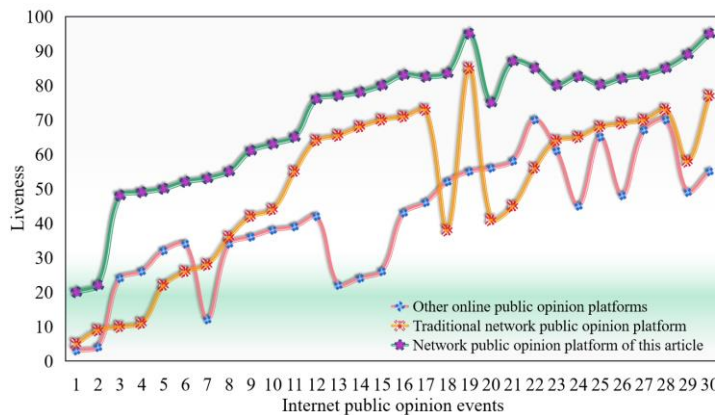


Figure 8: Comparison of activity display of online public opinion events on different platforms.

From the experimental results, it can be seen that the new public opinion platform provided can easily find those sensitive, controversial topics that get frequent attention and discussion through the heat estimation of the topics. College students can conduct relevant discussions on the topics through the online public opinion platform, and through the discussion, they can achieve the goal of ideological and political education, and can conduct ideological and political education while conducting online public opinion discussions. For college students, learning efficiency and self-improvement space are greatly improved.

5 CONCLUSION

Internet public opinion has become an important factor affecting college students' thinking mode and communicative behavior. As one of the most active groups of college students, they are keen to express their views and attitudes on events through the internet, and are also very vulnerable to the influence of online public opinion. While network public opinion brings convenience to college

students, bad network public opinion has a negative impact on college students' thoughts and behaviors, which puts forward higher requirements for college students' network literacy and network morality. This paper analyzes the cooperative education of college students' ideological and political education from the perspective of network public opinion, and constructs a network public opinion platform for the cooperative education of college students' ideological and political education, which is conducive to improving the effect of college students' ideological and political education. The experimental results show that the activity of the collaborative education platform of online public opinion and college students' ideological and political education based on this paper can reach 92.5%. The remarkable effect of ideological and political education for college students has reached 75.6%. It shows that the construction of online public opinion platform has a positive effect on the collaborative education of college students' ideological and political education.

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