The role of big data in network public opinion within the colleges and universities

Bin Xu1 · Ying Liu1

Accepted: 28 March 2022 / Published online: 17 May 2022 © The Author(s) 2022

Abstract
The online public opinion of colleges and universities, which utilizes social opinion, is a type of college student’s individualism that exists on campus and is a societal hot concern. With the advancement of Internet skills and uses, public perception of the network has changed significantly in terms of data quantity, sophistication, and production speed. The current public opinion assessment and monitoring system is hard to adapt to the variations occurring in this situation. It must be created under the guise of big data investigation. Furthermore, with the use of social opinion by colleges and universities, the problem of online public opinion is becoming more serious. The academic community has also been very interested in the college’s early warning research on online public opinion. This manuscript examines the role of big data in guiding network public opinion in colleges as well as in universities. It is based on the analysis of the current state of college online public opinion. Our proposed model builds multi-level and comprehensive guidance metrics for new media through dynamic monitoring. It will help colleges and universities prevent early warning, processing, and analysis of online public opinion. Besides, it will promote the professionalism of online public opinion management in colleges and universities accurately and effectively.

Keywords Big data · Early warning mechanism · Public opinion response decision

1 Introduction
Public opinion is a thematic replication of social truth in a particular age (Borik and Rabe 2012). It is a summary of the attitudes of the group, beliefs, emotions, and expectations. Public opinion (Page and Shapiro 1983) revolves around the presence, development, and transformation of an intermediate social event in a particular social space. The openness of the internet and virtual aspects of communication propel it to a new height. With the increase in technology and the fast spread of information technology IT, the number of people creating speeches on the Internet has greatly increased. For instance, cyber abuse happens very often. The effect of online public opinion on culture is growing, and managing it is becoming increasingly challenging (Callegaro and Yang 2018; Des Rosiers 2006; Berinsky 2006). The Internet era’s pressing concern is how to execute actual organization and authority of the public opinion network, public opinion examination -by precisely understanding the evolution of its dissemination-, and decreasing its harmful effects. As a result, a big number of academics have employed advanced approaches such as Machine Learning, Big Data, and Artificial intelligence AI. Among these methods, Big Data has received important attention recently, particularly in terms of guiding network public opinion.

Big data is the general term of information that can be aggregated and analyzed using research tools such as the Internet. In the framework of big data, the social contradictions are complicated. Different values collide with each other and the spread of information is accelerating. It makes the information on the network complex and the attention of the traffic high. In addition, the “undercurrent” behind the Internet serves as a window to show the dynamics of social group thoughts. It is estimated that a considerable part of the workforce will use the mechanism...
of group emotional mutual assistance, dissemination, and social network coupling to disseminate and aggregate ideas and value orientation. It can be said that the degree of attention paid to the information flow of the network can indirectly affect the normal functioning of the economy and society.

In recent years, there has been a high degree of attention among students on hot topics as the main element of the incident. Students generally lack social experience and media literacy. They can easily be misled by inflammatory information. In severe cases, they can lead to serious conflicts within academia and increase the handling of public opinion incidents in colleges and universities. Robert Heath pointed out that avoiding a crisis or quelling a crisis in its early stages is the greatest opportunity cost. The analysis of the big data network public opinion is now a hot topic for the present organizations. Because of the exponential growth of the Internet, the number of global Internet consumers is rising quickly. Many outstanding online social networks exist including some successful social sites of networking and micro-blogging. With huge micro-blogging messages being produced daily, how to knock these enormous quantities of data, examination, and propagation to attain sustainable track complex information and public opinion patterns top trend decisions has now become an essential approach and challenge. The conventional way of analyzing public opinion founded on data statistics is not appropriate (Pries 2006).

Conventional public opinion tracking techniques relied on high-priced workstations. In the face of enormous amounts of data, it is frequently demonstrated as great cost, poor expandability, single point interaction failure, and so on. When combined with the traditional database, it is difficult to batch process millions of data records. We demonstrate how to implement public opinion hot issue finding and monitoring. For this, developing an effective online early warning public opinion tool can serve as a fundamental safeguard for data mining, reporting, analysis, research, judgment, and evaluation. The management of online public opinion in colleges as well as in universities will help accurately control the complex network in the public opinion environment. The growth of a college online public-opinion timely warning system is critical. Each college student can comprehend the heart of the problem and create a reasoned decision by directing college students’ online thought and public opinion (Berinsky 2006). However, in the contemporary perspective of big data, vast network information poses fresh problems to the college online public opinion early-warning tool in terms of the scale of data processing and fast public opinion feedback.

To solve the problems of establishing a collegiate online public opinion early warning scheme in the context of big data, it is essential to formulate clear indications of early warning, quality judgment, and quantitative early warning. Creating an early warning system utilizes rating pointers (http://www.cac.gov.cn/2020-04/27/c_1589535470378587.htm). The opinion information is gathered by the association technique, which is based online as well as offline sources. The efficient screen prior to data analysis is opinion information. After screening, the data are analyzed using the online public opinion analysis component. Lastly, the paper summarizes the rationale composition as well as trend analysis founded on indicators of early warning. Uncertain factors are minimized in order to ensure positive and healthy online public opinion. As a result, this article constructs a scientific and efficient mechanism for networked public opinion organizations founded on big data technology and proposes that colleges and universities optimize a strategy for networked public opinion management. Other contributions of this research paper are listed follows:

1. Investigate the characteristics of colleges and universities network public opinion in the age of big data.
2. To construct an early warning mechanism for network public opinion in colleges as well as in universities.
3. To analyze the mechanism of university public opinion database.
4. Finally, conduct an investigation and design optimized Networked Public Opinion Management Strategies in colleges as well as in universities.

The rest of this paper is set as follows: Sect. 2 discusses related works by other scholars. Sect. 3 discusses the role of big data in the guidance of network public opinion in colleges and universities. Sect. 4 discusses optimized strategies for networked public opinion management in colleges and universities, and Sect. 5 winds-up our paper.

## 2 Related work

It is easy to see that social public opinion has evolved through various phases based on the present public-opinion examination of the related literature. It includes simple public opinion mining for huge data environments. The relation between present hot topics, government decrees, and social public opinion mining are analyzed in simple social public-opinion analysis. To get the original data analysis, simple social public opinion analysis is primarily conducted using a questionnaire survey. In this context, the authors of Laurenson (2006) used a sampling poll to investigate New Zealanders’ attitudes toward alcohol legislation. The authors of Abadie (2006) used data from the Gallup world opinion survey to investigate the link between attacks of terrorists and public opinion. The advent of Facebook, micro-blogging, Twitter, as well as
other social media platforms and services has accompanied network public opinion studies.

Because of the openness of the network, a huge amount of data is created daily. Additionally, the rise of multimedia has resulted in several formats of data, including text, video, images, audio, and so on. There are numerous network public opinion analysis tools based on the study of the features of huge data network public opinion. Public opinion analysis was conducted on weblog data mining, regarding the social network analysis of the relationship. Network public opinion monitoring, assessment, and governance are interdisciplinary, embracing computer science, supervision, sociology, interaction, psychology, and other regulation, and have stimulated the interest of academics in these disciplines.

Native researchers have studied China’s national situation from a variety of viewpoints in recent years. It includes monitoring and analyzing network public opinion, analyzing and responding to situations, and warning systems of crises. The researchers concluded elements such as network public opinion formation (Weisbach 2006), subject delivery characteristics (Ma and Chan 2006), subject evolution (Barker et al. 2006), emotional evolution (Berinsky 2006), group effects (Vreese and Boomgaarden 2006), influence analysis (Reluga et al. 2006), climate simulation analysis (Soroka 2006), and modeling (Dellarocas 2006) for monitoring and assessment. In terms of case study, researchers looked into the vulnerability analysis index system (Sethi 2006) and applied it to a precise area. Finally, the reaction, supervision, control, and significant areas of study included guide strategy (Howick et al. 2006), a method of reacting (Swanson et al. 2006), and model of governance (Knecht and Weatherford 2006), as well as models and methodologies used in forecasting and anticipating crisis events (Kolk and Pinkse 2006). Inhouse research also includes company management in terms of university education, policy decisions, group activities, food security, and the application of research activities (Basher 2006). The authors investigated the effect of the network’s public opinion on the structure and quantity of the play in Ma and Chan (2006). In addition to the above, little research has been done on the technical sides of public opinion assessment using large data networks. In light of these considerations, we investigate the role of big data in the guidance of network public opinion in colleges as well as in universities. It improves the efficiency and motivation of students forming opinions in colleges and universities.

### 3 Role of big data in the guidance of network public opinion in colleges and universities

In this section, we explain the role of big data in supervisory network opinion in universities and colleges. To discuss our proposed model, we first describe the characteristics of colleges and universities utilizing big data, and then we build an early warning mechanism for network public opinion in colleges and universities. Finally, we describe our optimized Networked Public Opinion Management strategies in universities as well as in colleges.

#### 3.1 Analysis of the characteristics of colleges and universities network public opinion in the era of big data

Many college and university students use social media to direct their feelings and opinions as a group with active thoughts in their daily lives. Public opinion has risen as a result of the widespread use of social media. Teachers will benefit from analyzing public opinion on social media to better understand their students’ perspectives and provide theoretical education advice. This dissertation employs big data to guide network public opinion in colleges and universities to effectively investigate public opinion. The characteristics of colleges and universities’ network public opinion in the age of big data can be explained in Fig. 1.

##### 3.1.1 The suddenness of the incident

Suddenness is a significant feature of online public opinion in universities as well as in colleges. In general, there will be some controllable signs at the start of public opinion. Most of them will be ignored by the managers. Therefore, when information is quickly gathered and stimulated, it will explode quickly, making all parties involved. At present, students can use Weibo, WeChat, QQ, Tieba, Douyin, and various video websites to access. They can receive and publish information, and form huge traffic by reposting comments and other functions. This leads to the bursting of public opinion and is forced to disperse the public opinion control of university directors (Berinsky 2006).

##### 3.1.2 Dispersal of public opinion

The diffusion of public opinion online in colleges and universities has accelerated. In the age of big data, the rise of emerging media has helped disseminate public opinion in colleges and universities. Coupled with the open nature of the Internet, network users can distribute information...
more freely and easily. This not only facilitates communication between individuals but also speeds up the spread of public opinion online.

### 3.1.3 Group cohesion

Group cohesion is the total amount of all the factors that cause group members to remain in or be drawn from the group. Group cohesion can be thought of as the cultural glue that holds the group members with each other. Numerous individuals assume that teamwork with a strong group cohesion feature can perform much better in terms of achieving work objectives. Even so, users should be aware that the study on this assertion is mixed. Group cohesion is caused by the interaction of several factors and not by a single cause, whereas group cohesion can have an impact on group achievement. Teamwork can also generate or boost group cohesion. Individuals in highly integrated groups, on the other hand, may be encouraged to do more. This may or may not be under the organization’s performance goals. As a result, group cohesion might harm group task performance. There is certain group distinctiveness in the state of opinion provoked by collegial events. According to the China Internet Information Center’s 45th “Statistical Report on the State of China’s Internet Development,” in March 2020, the total number of Internet users in the country exceeded 900 million, and the Internet rate of penetration reached 64.5%. The Internet users aged 20–29 years account for 21.5% (http://www.cac.gov.cn/2020-04/27/c_1589535470378587.htm). Among young users of the Internet, students are the main force. Although students have a certain amount of knowledge, they are easily affected by external factors. They are active on matters involving their interests. They express emotional remarks and lack social experience. There is a general lack of rational thinking and effective filtering of information about the problem but will be prompted to influence and blindly follow the crowd.

### 3.1.4 Broadcast content

The broadcast content is more diverse and rich. In the big data age, students are involved in a wider range of opinions and emotional expressions, and they continue to accumulate. The structure of data and information will gradually become more complicated, causing a snowball effect. In addition, the event spread also increases the multiplier. It will continue to deepen the impact, which in turn will provoke public opinion on the Internet.

### 3.2 Building of an early warning mechanism for network public opinion in colleges and universities

The early warning method for college and university network public opinion is referred to respect the consistency, commonality, and directional characteristics of college and university network public opinion. Establishing an appropriate monitoring mechanism to collect and analyze public opinion, summarizing the rationale composition and trend analyses of college and university network public opinion, and rationalizing management policy with the existing organization. As per legislation of the college and university network public opinion, people are guided to make a scientific, rational judgment and reaction when they are aware of any upcoming cultural progress. College Network public opinion frequently occurs in a location where public opinion is concentrated and flows freely. The creation of a university network public opinion early warning mechanism should include widespread organizations and public
media on campus. Aside from the aforementioned, college and university public opinion, early warning mechanisms refer to the use of big data to do a good job in surveillance, prevention, early warning, analysis, and treatment of public opinion in colleges as well as in universities based on information gathering, to understand and properly handle potential situations, and to adjust response strategies in real time.

3.3 Dynamic monitoring technique of public opinion in colleges and universities

The most serious connection in the procedure of dealing with public opinion in colleges and universities is whether the relevant management departments can monitor the emergence of public opinion online efficiently and accurately. This involves the use of a relatively mature dynamic surveillance mechanism. The operation of the dynamic surveillance mechanism involves specific requirements in terms of computer processing technology and surveillance means. At the same time, it should be staffed with professionals capable of analyzing and controlling network data monitoring. Achieve perfect collaboration between personnel and technology, conduct research and judgments based on dynamic monitoring results, and perform real-time report reminders via preliminary judgments to summarize data for further measurements.

In the three stages of online public opinion development, the timely development of public opinion is difficult to detect and observe with the naked eye. The data do not reach a certain peak and is easily ignored by surveillance. Also, there are many platforms to monitor but the data are scattered. The monitoring phase must be careful and avoid problems. According to Fig. 2, the monitoring subsystem covers systems such as Weibo, Real-Time Forums, Douyin Kuaishou, Tiebu, and official accounts, and reports everything based on the actual situation so that action can be taken in a timely.

3.4 College and university public opinion database summary mechanism

The aggregation mechanism mainly comprises the collection and integration of information. The aggregation mechanism solves the task of aggregating information and begins to bring into play the subjective initiative of managers. In the three-level transmission system of “school-college staff”, after centralized feedback from the monitoring mechanism, it is integrated and processed by management staff, and current dynamics are included in the database data for archiving, and then viewed from time to time. The information is updated over time, which is convenient for the next step of the analysis. Figure 3 shows the overall mechanism of college and university public opinion database summary.

The database summary mechanism of college and university opinion consists of four systems.

3.4.1 Surveillance system

Surveillance is the monitoring of behavior, information, or influence. In simple words, it is the practice of closely observing an individual or a group. Our surveillance system monitors public opinion with the help of Weibo, WeChat, Forum, and News platforms. This system gives collected public opinion to the Pooling system.

3.4.2 Pooling system

It is a systematic procedure for gathering and incorporating opinions (in our scenario, public opinion from colleges and universities) from a group (pool) of participants. The pooling system collects information from the Surveillance system for integration.

3.4.3 Analysis system

It is the process of studying a method to identify its aims and objectives and to develop systems and procedures that can achieve them effectively. It consists of a decision information base, information mining, and expert analysis of public opinion.

3.4.4 Disposal system

It is the final system, which consists of case assignment, hierarchical monitoring, and disposal plan.
3.5 Analysis mechanism of university public opinion database

Academic Public Opinion Database Analysis Mechanism refers to the systematic analysis of information in the database. First, quantitative analysis is used to form a model and use data analysis software to process the data to increase the fairness and correctness of the efficiency of network public opinion analysis. Following quantitative analysis, the expert module for standardized analysis is integrated. Numerous different data must be identified and analyzed to determine the way and tendency of public opinion development. Furthermore, to refine and optimize the information summarized in the database, as well as to solicit public opinion for administration. Be dynamic and make fair judgments to serve as a reference for decision-making. The Analysis Mechanism of the college and university Public Opinion database can be explained in Fig. 4.

3.6 Early warning mechanism for the crisis of public opinion in colleges and universities

In colleges and universities, the public opinion early warning mechanism refers to determining the level of early warning of public opinion based on quantitative and qualitative results of the analysis mechanism. It monitors the plans that should be provided based on different levels of early warning. Depending on the administrative regulations of the relevant institutions in the country, and the factors of international practice of the tendency to explode public opinion, the warning levels are divided into general warning (normal level), warning light (abnormal condition), and moderate. In addition, there are five categories of early warning: alert, severe early warning, hazardous, severe early warning, and extremely dangerous (http://www.acftu.org/template/10041/file.jsp?cid=1241&aid=96764).

3.7 Mechanism for eliminating public opinion in colleges and universities

As for the mechanism for handling public opinion in colleges and universities, it is essential to approach based on the dynamic and timely monitoring of public opinion and information feedback. First, colleges and universities should fully embrace their position as a constructive guide in the mainstream media during public opinion incidents by conducting hierarchical processing and real-time monitoring of numerous platforms. Following that, they should implement high-precision public opinion propaganda using big data technology and publish the incident’s origin efficiently and accurately to avoid incident fission. Second, colleges and universities should do a great job of integrating information in the process based on big data.
technology. By breaking down platform barriers, they should be able to communicate with government, media, and network supervision departments. Furthermore, by performing well in public opinion development research and judgment, they should be able to perform the mechanism’s predictive function. Finally, form a multi-angle public opinion management plan that allows for rapid response and effective management of specific events in public opinion. Figure 5 explains the intensity of supervision and guidance of college students’ online public opinion.

Figure 6 explains the comparisons among our selected public opinion technologies such as supervision, analysis, prediction, guidance, and others. According to this figure, public opinion prediction technology has the highest ratio as compared to the rest.

4 Optimized strategies for networked public opinion management in colleges and universities

To fill in the gaps in a timely manner, big data is a “double-edged sword”. Therefore, colleges and universities need to make good use of big data to optimize public opinion processing strategies. Figure 7 explains the overall process of optimized strategies for networked public opinion organizations in colleges as well as in universities.

As per the diagram above, the network public opinion system collects opinions from college and university students. This system sends these opinions to the public opinion examination engine, which then assigns them to the public opinion examination model. Similarly, this system stores these opinions in the database server, where they’re being supplied to an index server through a bi-directional process. Following that, an early warning mechanism is created through monitoring, analysis, and intervention.

4.1 Cultivate a high-level network public opinion work leadership mechanism to make big data network public opinion organization professional

In the period of big data, the heart of the management and control of public opinion oversight in colleges and universities lies in the work leadership mechanism. Colleges and universities should strengthen and improve organizational guarantees and cultivate specialist teams for alerting various leading departments and institutions of the school. As a result, from the perspective of universities, the school office, the party office, the propaganda department, the student office and college counselors, student information officers, and so on can form the network public opinion leader and executor system. To achieve rapid discovery, understanding, and resolution, the team of public opinion networks must work hard to improve its overall quality and promote the professionalization of public opinion processing in colleges and universities.

The second goal is to improve the work system’s structure, manage campus networks effectively, and standardize the use of campus networks. Simultaneously, increase the building and oversight of the public opinion work system, such as establishing a daily monitoring work system, an information spokesperson system, and ensuring that public opinion is correctly addressed through a professional system’s mechanism.

4.2 Improve the multi-level network public opinion model to make big data network public opinion management more precise

The big data network public opinion monitoring must highlight the accuracy characteristics. To improve the multi-level network public opinion model, we first ensure full data acquisition. It is possible to create a multi-in-one network public opinion structure model by improving the parameters of the network public opinion research and judgment model and using big data technology to capture the results. Using different combinations with varying degrees of freedom, establish linear relationships and fragment associations, and construct the high dynamic operating mechanism of public opinion in the school network. Simultaneously, it is necessary to avoid the mechanical system of the network monitoring the public opinion of the network. In the college and university network monitoring system, it is essential to focus on building

![Fig. 5 The intensity of supervision and guidance of college students’ online public opinion](image-url)
the "artificial intelligence and big data" model, to eliminate the complexity and dilemma of formatting the public opinion monitoring data of the network.

4.3 **Build a new media matrix guided by online public opinion to make big data online public opinion management more efficient**

Firstly, the official fresh media platforms of colleges and universities should form an organic whole that is closely associated with various types, levels, and sub-platforms, resonate with the same frequency and form a synergy. The official account, which has become the major avenue for authoritative school promotion, should do a good job of interpreting school policies and marketing the image. The school’s functional departments, colleges, and student club accounts must provide specialized and advanced information based on their own needs so that teachers and students can grasp the situation. At the same time, it can build a big database collaboratively distributed public opinion cloud platform and use the fast-computing power of big data to deliver cross-platform resource-sharing data analysis results. Making it multidisciplinary, creative, and integrated for processing and analysis to network public opinion in colleges and universities. In this way, public opinion data can obtain internal and external collaboration, open links between resources, and promote effective monitoring of public opinion.

**5 Conclusions**

With the fast growth of online social media, a true media stage has progressively attained. Everybody can generate web content and rapidly distribute it over connected social networks. Huge data have posed a significant challenge to public opinion control. Big data has the potential to transform online public opinion management. The paper

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**Fig. 6** The proportion of technology lags in the guidance of online public opinion in the university
creates a big data-driven public opinion analysis stage to precisely understand the internal features of public opinion and its development. This paper first established a technical and ideal connected public opinion early warning mechanism, then designed 5 layers stratified early warning organization mode, and designed 3 levels college online public opinion primary warning segment. Secondly, it issued an early warning of public opinion. Finally, it optimized Networks, explained the management and control of public opinion, strengthening the creation of important networks for social constancy and improvement.

Funding The authors have not disclosed any funding.

Data availability Enquiries about data availability should be directed to the authors.
Declaration

Conflict of interest The authors have not disclosed any competing interests.

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