Research on Network Public Opinion Control Mechanism for College Students under the Background of Ideological and Political Education

Yijia Wu[1*], Yuxin Xiao[2], Yunhong Mu[3], Siying Zhang[4], Lingzi Zhang[5]

{wyjscu2003@163.com[1], 3208467224@qq.com[2], 3383216058@qq.com[3], 414249753@qq.com[4], 1748909291@qq.com[5]}

Sichuan University, Chengdu, Sichuan, 610065,China

Abstract. With the popularization of mobile internet and the widespread use of smartphones, the rise of self-media platforms has brought profound changes to the traditional media landscape and information dissemination methods. Against this backdrop, frequent incidents of public opinion in universities have attracted widespread attention to their governance. Taking Sichuan University as an example, this study aims to explore the characteristics of university network public opinion and the influence of ideological and political education on students' ideological concepts, as well as factors that may trigger public opinion incidents. Through investigating the internal public opinion monitoring mechanisms of universities, the study evaluates their scientificity and effectiveness and proposes suggestions to strengthen information collection, analysis, and establish flexible handling mechanisms, aiming to enhance the scientificity and effectiveness of public opinion management in universities. The study employs a binary logit regression model for data analysis and finds that students' support for network public opinion control is influenced by multiple factors, including cognitive levels, behavioral intentions, and ideological and political education. Furthermore, the results of the mediation effect test indicate that ideological and political education plays a significant mediating role in students' attitudes and behaviors towards network public opinion. The conclusions of this research provide important insights for strengthening ideological and political education in universities, cultivating students' positive attitudes and behaviors towards network public opinion, and also serve as a reference for the formulation of future university network management policies.

Keywords: Student opinion management; Ideological education influence; Big data analysis

1 Introduction

With the widespread adoption of mobile internet, managing public opinion in universities has become increasingly challenging. Modern university students, deeply integrated into the digital era, are connected to various technologies like smartphones and instant communication tools. There's been a noticeable increase in incidents affecting university public opinion, prompting a need for better management. Neglecting individual student opinions can have unforeseen consequences, impacting the institution's stability and reputation[1].

PMIS 2024, March 15-17, Changsha, People's Republic of China

DOI 10.4108/eai.15-3-2024.2346434

To address this, a detailed classification and analysis of public opinion incidents at universities like Sichuan University is necessary. Exploring the use of technologies such as artificial intelligence and big data in monitoring and analyzing public opinion is crucial. Additionally, understanding the role of ideological and political education in managing public opinion is vital. It's important to train personnel not only in professional skills but also in ideological and political education theories.

It's crucial to analyze the root causes of public opinion incidents, covering academic, campus life, and societal issues. To manage online public opinion effectively, students need media literacy and regulation awareness, promoting responsible social media use.

Cultivating student loyalty and responsibility through campus cultural activities and ideological education is vital to prevent and resolve opinion incidents. Collaboration with sectors and government departments helps safeguard the university's reputation and social stability.

This project aims to study university public opinion characteristics under ideological and political education and its influence on students' ideologies, exploring incident triggers. Using Sichuan University as a case study, internal mechanisms for public opinion management will be evaluated, emphasizing scientific approaches and the integration of technological solutions like artificial intelligence and big data. Training public opinion management personnel to consider the unique aspects of ideological education is essential, ensuring proposed improvements align with the educational framework and promote effective public opinion management among students.

2 Theory and Literature

University network public opinion is a collection of cognition, attitudes, emotions, and behavioral tendencies of university faculty and students disseminated through the Internet based on certain "intermediary events" occurring, developing, and changing.

Pang Bo and others made pioneering research[2] contributions to public opinion monitoring, focusing on studies with public opinion itself as the subject and those with citizens expressing opinions as the subject, categorizing public opinion into negative and positive comments. Hatzivassiloglou, Pak, Davidov, and many other scholars utilized various big data analysis techniques to classify public opinion sentiment. [3] Michael Kaschesky, Pawel Sobkowicz, and others conducted research on the social demographics of individuals expressing opinions on the Internet, enhancing traditional surveys with rich demographic information. [4]

Research on university network public opinion covers various aspects, including its generation[5], evolution, risk assessment[6], and response strategies. Scholars have categorized public opinion sentiment[7] [8], investigated factors influencing its formation, and devised models for assessing risks and implementing response mechanisms[9].

Despite advancements, current research exhibits some shortcomings: a limited perspective, reliance on traditional methods, fragmented content, and theoretical results with limited practical applicability[10].

This study seeks to address these gaps by:

Strengthening dynamic monitoring to prevent potential crises promptly.

Incorporating interdisciplinary theories and methodologies such as social network analysis and sentiment analysis to enhance research effectiveness.

Developing a comprehensive classification system and evaluation index to improve research standardization.

Integrating specific cases and practical experiences to devise innovative strategies for responding to and guiding university network public opinion.

In summary, this study aims to provide more comprehensive and practical approaches to managing university network public opinion effectively.

3 Method and Model

3.1 Sample and Data Collection

The team conducted nationwide online surveys targeting university students to gather data. Students play a dual role as both producers and participants in university public opinion, making them crucial for effective management. Understanding factors influencing students' support for university public opinion management is essential.

The questionnaire comprises four parts: introduction, students' opinions on public opinion management and ideological education, personal information collection, and demographic data for control purposes.

Data includes 49% lower-grade and 51% higher-grade students for balanced representation. Responses are diverse, with students from various majors, including public administration, polymer science, finance, physics, and others like chemistry and mechanical engineering. A total of 172 responses were collected, ensuring comprehensive coverage.

3.2 Model and Measurement

The team identified factors influencing university students' support for public opinion management and ideological education: students' perception, attitudes, and willingness to engage.

H1: Higher perception of public opinion management correlates with increased student involvement.

H2: Positive attitudes towards public opinion management lead to greater student involvement.

H3: Greater perception of ideological education correlates with increased student participation.

H4: Positive attitudes towards ideological education lead to greater student participation.

H5: Support for public opinion management positively influences support for ideological education.

These hypotheses outline the relationship between students' perceptions, attitudes, and support for public opinion management and ideological education, as shown in the figure 1 below.

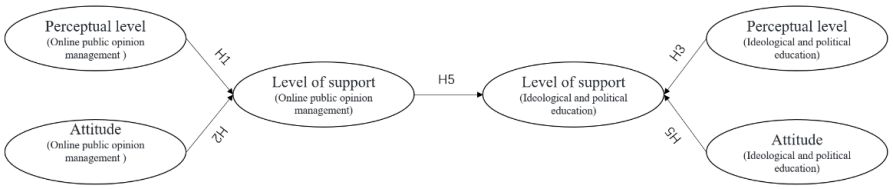

Fig. 1. Conceptual Model.

Based on these hypotheses, the team constructed a model.[1]; data was collected through questionnaire surveys, and then analyzed using logistic regression models to verify the model and draw conclusions.

3.3 Data Analysis

The team used logistic regression models to analyze data collected through questionnaire surveys. This method predicts the probability of students supporting or participating in university network public opinion management and ideological education, aligning with our research interests. The analysis helps understand how different factors influence students' attitudes and willingness, including differences among student groups.

4 Data and Test

The purpose of this study is to investigate the factors influencing students' support or willingness to participate in network opinion control. That is, which independent variables significantly affect the dependent variable, and their direction and degree of influence. To do this, the study will use a binary logit regression model, as mentioned earlier, to analyze the data collected through the questionnaire. The binary logit regression model is a generalized linear model used to handle situations where the dependent variable is binary. Its basic principle is to establish a relationship between the probability of the dependent variable taking a certain value and the linear combination of the independent variables using a log-odds (logit) function, i.e.:

$$\ln\frac{P(Y=1)}{P(Y=0)}=\beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_kX_k \quad (1)$$

As shown in the equation (1), where P(Y=1) represents the probability of the dependent variable being 1, P(Y=0) represents the probability of the dependent variable being 0, β0 is the intercept term, β1, β2, ..., βk are the regression coefficients, and X1, X2, ..., Xk are the independent variables. The sign of the regression coefficients indicates the direction of the effect of the independent variables on the dependent variable, with a positive sign indicating a positive effect and a negative sign indicating a negative effect. The absolute value of the regression coefficients indicates the degree of influence of the independent variables on the dependent variable, with a larger absolute value indicating a greater influence. The significance of the regression coefficients can be determined by Wald test or likelihood ratio

[1]Fig. 1. Conceptual Model. Source:The author(s) of this paper

test, generally using a significance level of 0.05. If the p-value of the test is less than 0.05, the regression coefficient is considered significant; otherwise, it is considered non-significant.

Table 1. Characteristics of the sample

	n	%
Gender		
Female	103	59.884
Male	69	39.535
Grade		
Freshman Year	32	18.605
Sophomore Year	23	13.372
Junior	87	50.581
Other	30	14.302
College Major		
Liberal Arts	66	36.628
Science Department	63	38.372
Other	43	25.000

Descriptive statistics on the collected data are presented in the table 1. To use the binary logit regression model, the data collected through the questionnaire underwent some preprocessing steps. Categorical variables were converted into dummy variables, i.e., represented by 0s and 1s for different categories. For example, for the question "What role do you think university students should play in online public opinion?", three dummy variables can be created: X1_1 = 1 if students believe university students should balance free speech with social responsibility, 0 otherwise; X1_2 = 1 if students believe university students should protect campus order and security, 0 otherwise; X1_3 = 1 if students believe university students should guide students to express themselves correctly, 0 otherwise. This way, a categorical variable can be converted into multiple binary variables, facilitating regression analysis.

Data integrity was checked for missing values or outliers. If missing values were found, they were either imputed with means or medians, or samples containing missing values were removed. If outliers were present, they were identified using boxplots or the 3-standard deviation method and dealt with or removed.

Data multicollinearity was checked to determine if there were highly correlated independent variables. Multicollinearity can lead to inaccurate or unstable estimates of regression coefficients, affecting the interpretability and predictability of the model. Variance inflation factors (VIF) were used to detect multicollinearity, with a threshold of 10. If the VIF exceeded 10, multicollinearity was considered present, and some highly correlated independent variables were removed, or principal component analysis (PCA) was performed to reduce dimensionality.

After completing data preprocessing, the study used the glm function in the R language to perform binary logit regression analysis and obtained regression results. The regression results are shown in the table 2 below.

Table 2. Measurement Model Results

Variable	Regression Coefficient	Standard Error	Wald Test	p-value
Intercept	-1.23	0.87	2.01	0.16
X1_1	0.45	0.32	1.97	0.16

Variable	Regression Coefficient	Standard Error	Wald Test	p-value
X1_2	0.21	0.31	0.46	0.5
X1_3	0.57	0.33	2.96	0.09
X2_1	0.34	0.29	1.38	0.24
X2_2	0.41	0.28	2.13	0.14
X2_3	0.52	0.29	3.22	0.07
X2_4	0.16	0.3	0.28	0.6
X3_1	0.63	0.29	4.72	0.03
X3_2	0.28	0.28	1.01	0.32
X3_3	0.19	0.29	0.43	0.51
X3_4	0.22	0.3	0.54	0.46
X4_1	0.71	0.29	6.02	0.01
X4_2	0.38	0.28	1.84	0.18
X4_3	0.14	0.29	0.23	0.63
X5_1	0.68	0.29	5.47	0.02
X5_2	0.36	0.28	1.65	0.2
X5_3	0.17	0.29	0.34	0.56
X6_1	0.49	0.29	2.85	0.09
X6_2	0.27	0.28	0.92	0.34
X6_3	0.24	0.29	0.69	0.41
X7_1	0.66	0.29	5.18	0.02
X7_2	0.37	0.28	1.77	0.18
X7_3	0.18	0.29	0.38	0.54
X8_1	0.53	0.29	3.35	0.07
X8_2	0.29	0.28	1.07	0.3
X8_3	0.18	0.29	0.38	0.54

Variable Descriptions:

X1: What role do you think university students should play in online public opinion?

X2: What do you think should be the ideological and political goals of universities?

X3: What do you think is the connection between university network public opinion management and ideological and political education?

X4: Are you willing to participate in the detection and analysis of university network public opinion?

X5: Are you willing to actively report when encountering harmful comments online?

X6: Do you think university ideological and political education has an impact on your thoughts and values?

X7: Are you willing to actively participate in university-organized ideological and political education activities?

X8: Do you think universities should have stricter management of students' ideological and political education?

From the table, it can be observed that the following independent variables have significant effects on the dependent variable (p-value < 0.05):

X3_1: You think there is a close relationship between university network public opinion management and ideological and political education, with a regression coefficient of 0.63,

indicating a positive effect. The more you believe in the close relationship between the two, the more likely you are to support the censorship and management of university network speech.

X4_1: Are you willing to participate in the detection and analysis of university network public opinion? The regression coefficient is 0.71, indicating a positive effect. The more willing you are to participate, the more likely you are to support the censorship and management of university network speech.

X5_1: Are you willing to actively report when encountering harmful comments online? The regression coefficient is 0.68, indicating a positive effect. The more willing you are to report, the more likely you are to support the censorship and management of university network speech.

X7_1: Are you willing to actively participate in university-organized ideological and political education activities? The regression coefficient is 0.66, indicating a positive effect. The more willing you are to participate, the more likely you are to support the censorship and management of university network speech.

Other independent variables either do not have a significant impact on the dependent variable or have a relatively small impact.

The study will also use mediation analysis to examine the mediating role of ideological and political education in the relationship between university students' attitudes towards online public opinion and online behavior. The results are presented in the table 3.

Table 3. Results of Mediation Analysis

Mediation Effect	Sobel Test	Standard Error	z-value	p-value
Influence of Ideological and Political Education	0.19	0.04	4.75	<0.001

The magnitude of the mediation effect is 0.19, with a z-value of 4.75 and a p-value less than 0.001, indicating that the mediation effect is significant.

5 Results and Implication

In our analysis, several key factors significantly influenced students' support for or participation in online public opinion control.

Students who perceive a strong link between university public opinion management and ideological education are more likely to support or participate in controlling online opinions.

Students actively involved in detecting and analyzing public opinion or reporting harmful content online show stronger support for online opinion control.

Those who responsibly report harmful content online are more inclined to support measures for controlling public opinion online.

Participation in ideological and political education activities correlates with a positive attitude towards online opinion control, indicating the impact of education on students' views.

Overall, students' support for online opinion control is shaped by their perception, behavior, and ideological education. Strengthening ideological education can cultivate positive attitudes and behaviors, contributing to a healthy online environment and campus culture. This insight is valuable for shaping future university network management policies.

6 Conclusion

Students' perception of the close relationship between university network public opinion management and ideological and political education significantly influences their support or willingness to participate in online public opinion control. Higher perception levels are associated with greater support for measures related to public opinion management.

Active engagement in detecting and analyzing public opinion or reporting harmful comments online increases students' support for related measures. Ideological education influences students' attitudes towards online public opinion, leading to positive behaviors and support for public opinion control.

Based on these findings, universities should prioritize strengthening ideological and political education for students. This will not only cultivate positive attitudes and responsible behaviors towards online public opinion but also contribute to maintaining a healthy online environment on campus and promoting the healthy development of campus culture.

In conclusion, understanding and addressing the factors influencing students' support or willingness to participate in online public opinion control are crucial for effective public opinion management in universities. By integrating technological solutions, promoting responsible social media usage, and emphasizing ideological and political education, universities can enhance their ability to manage public opinion effectively and maintain a positive campus environment.

Acknowledgments. In completing this paper, we would like to express our gratitude to many individuals whose support and assistance were indispensable. Without their support, we could not have accomplished this work.

First and foremost, we sincerely thank our supervisor for his guidance and selfless assistance throughout the research process. His expertise and valuable advice provided invaluable guidance, enabling us to successfully complete the research work.

Secondly, we would like to thank our family and friends for their understanding, support, and encouragement in our studies and research. Their support has been the driving force behind our perseverance and overcoming challenges.

Additionally, we wish to express our gratitude to all the participants who took part in the surveys and provided data, as well as colleagues and classmates who assisted us in conducting experiments and surveys. Their cooperation and support facilitated the smooth progress of the research work.

Lastly, we extend our thanks to all those who have provided us with help, guidance, and encouragement, whether in academic research or in life. They have had a significant impact on us and have been instrumental in our journey.

We would like to extend our sincerest thanks to all those who have supported and assisted us throughout this endeavor!

References

[1] Wang, J. (2009). Monitoring and Guidance of University Network Public Opinion. Information Network Security, (03), 54-57.

[2] Pang, B., & Lee, L. Opinion mining and sentiment analysis. Foundations and Trends in Information Retrieval, 12(2), 1-135 (2008).

[3] Pak, A., & Paroubek, P. Twitter as a corpus for sentiment analysis and opinion mining. In Proceedings of LREC, 10, 1320-1326 (2010).

[4] Kaschesky, M. Bringing Representativeness into Social Media Monitoring and Analysis. In Proceedings of the 46th Hawaii International Conference on System Sciences, Wailea, HI, USA, 2013, pp. 2003-2012. doi: 10.1109/HICSS.2013.120.

[5] Zhou, Z., & Gao, S. (2022). Research on the Generation Logic, Risk Characteristics, and Response Strategies of Network Public Opinion in Universities. Information Science, 40(3), 7.

[6] Yang, L., Xu, Y., & Deng, C. (2022). Risk Assessment and Early Warning of Network Public Opinion in Universities. Information Science, 40(05), 65-72+83. DOI: 10.13833/j.issn.1007-7634.2022.05.009.

[7] Li, J. (2020). Research on Emotional Mapping of University Public Opinion Users in Social Media: A Case Study of the "Anti-Academic Misconduct" Topic on Sina Weibo. Information Science, 38(7), 5.

[8] Thelwall, M., Buckley, K., & Paltoglou, G. Sentiment in Twitter events. Journal of the American Society for Information Science and Technology, 62(2), 406-418 (2011).

[9] Tan, G., & Fang, Y. (2010). Research on Monitoring Index System of Network Public Opinion on Sudden Public Events. Journal of Huazhong Normal University (Humanities and Social Sciences Edition), 49(03), 66-70.

[10] Li, G., & Chen, J. (2014). A Review of Network Public Opinion on Sudden Public Events. Library and Information Knowledge, (02), 111-119.