International Journal for Housing Science and Its Applications
Publish August 6, 2025. Volume 46, Issue 3 Pages 6943-6952

https://doi.org/10.70517/ijhsa463595

Topological Optimization Path for Reconstructing National Security Education Knowledge Dissemination Using Graph Theory Algorithms

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Abstract National security education knowledge dissemination is an important means to enhance the security awareness of all people. In the digital era, social networks have become the main channel for knowledge dissemination, but the traditional dissemination model is difficult to accurately describe the information flow characteristics in social networks. Based on complex network theory, this study explores the dissemination law of national security education knowledge in social networks by improving the SIRI dissemination model, and proposes strategies to optimize the dissemination path. The study constructs an improved SIRI model containing three states of information unknowns, information disseminators and information ignorers, and introduces five key parameters: external social influence probability, internal network influence probability, immunization probability, direct immunization probability and external network influence probability. Based on the microblogging real data validation, the results show that the national security education tweets generated 325,622 retweets in the first 24 hours, accounting for 96.8% of the total retweets; after adopting the method of this paper, the peak of propagation decreased from 0.5342 to about 0.4, and the propagation speed was obviously slowed down. The study finds that digital media break through the geographical restrictions and realize the universal coverage of national security education; social platforms such as “two micro one end” build an efficient information exchange channel between the state and the nationals; and personalized content delivery supported by big data analysis and algorithms improves the relevance and attractiveness of national security education. This study provides theoretical basis and practical guidance for the dissemination of national security education knowledge, which is of great significance in promoting the dissemination of national security education for all.

Index Terms Complex network, SIRI communication model, national security education, information dissemination, optimization path, digital media

I. Introduction

Against the background of the great change that has not been seen in a hundred years, national security is facing threats and challenges such as terrorism, network security, economic security and so on [1]. As the front line of ideological work, colleges and universities must place national security education in an important position, and cultivating the national security awareness of college and university students is conducive to stimulating their patriotic enthusiasm and guiding them to actively devote themselves to the cause of socialist construction [2]-[4]. However, there are still some deficiencies in the current systematization and pattern exploration of national security education in colleges and universities, and there is still a lack of in-depth theoretical summaries and general models that can be promoted and replicated, and there is still much more room for improving the quality of education [5], [6]. For example, under the environment of rapid social development and explosive growth of information, college students pay little attention to national security issues, behind this phenomenon of emotional indifference, it actually reflects the lack of in-depth understanding and personal experience of college students on national security [7]-[9]. The root cause of this is that the current education system is mostly the instillation of theoretical knowledge, and most college students' understanding of national security stays on the surface, lacks in-depth thinking and experience, and is unable to connect what they have learned with real life and the future, which makes it difficult to form a strong sense of responsibility and sense of mission [10]-[13]. Based on this, the scientific dissemination path of national security education knowledge in the new era is explored in order to cultivate college students' awareness of national security and improve their ability to safeguard national security in a targeted manner in accordance with the characteristics of colleges and universities [14], [15].

National security is the basic premise for the survival and development of a country, and national security education is an important way to enhance the security awareness and preventive ability of all people. In today's rapid development of informationization, social networks have become an important carrier for the dissemination of national security education knowledge. Information dissemination in social networks is characterized by rapidity, extensiveness and complexity, which makes it difficult for traditional information dissemination models to accurately describe the knowledge dissemination process in the social network environment. In order to better understand and predict the dissemination law of national security education knowledge in social networks, it is particularly important to construct an information dissemination model that meets the actual situation. Complex network theory provides new ideas for studying information dissemination, in which infectious disease dynamics models such as SI, SIS and SIR models are widely used in network information dissemination research. However, these classical models have some limitations when applied to social network information dissemination: first, social network users may become immunizers rather than disseminators directly after being exposed to information; second, users' dissemination behaviors are affected by a variety of factors, including social relationships, media orientation, and governmental interventions; and third, users may be affected by information from other platforms and change their status. To address these issues, it is necessary to improve the classical model and construct a model that is more in line with the characteristics of social network information dissemination. The development of digital media provides new communication channels and technical support for national security education, which breaks the time and space limitations of traditional communication and realizes the rapid transmission and wide coverage of information. At the same time, digital media also make the interaction between the state and nationals more convenient and efficient, creating favorable conditions for the universal dissemination of national security education. However, how to make use of the advantages of digital media to optimize the dissemination path of national security education knowledge and improve the dissemination effect is still a problem that needs in-depth research.

Based on complex network theory, this study improves the classical SIR model for the dissemination characteristics of national security education knowledge in social networks, and proposes a SIRI information dissemination model suitable for social network environment. The model categorizes network nodes into three states: information unknown, information disseminator and information ignorer, and considers multiple influencing factors of information dissemination in social networks, including internal and external influences and node state transition mechanisms. The validity of the model is verified by analyzing the real data of microblogging, and the optimization path of national security education knowledge dissemination is explored based on the model results. The study adopts a simulation approach to simulate the information dissemination process in social networks by constructing a network structure with scale-free characteristics, comparing the dissemination effects under different strategies, and providing theoretical support and practical guidance for the effective dissemination of national security education knowledge.

II. Complex network-based SIRI propagation models

II. A. Theoretical Foundations of Complex Networks

II. A. 1) Basic concepts of complex networks

(1) Degree and degree distribution

In network theory, degree can be understood as the number of neighbors of that node. The degree of a node is a fundamental topological feature that is important for understanding the structure and nature of a network.

For an undirected network, the degree of a node is the number of edges connected to it. For a directed network, a node has an in-degree and an out-degree, which indicate the number of edges pointing to that node and the number of edges pointing from that node to other nodes, respectively. The in-degree indicates the number of connections or degree of association of other nodes pointing to the node. The out-degree indicates the number of connections or degree of association of that node pointing to other nodes [16]. The average degree is the average number of connections of all nodes in a network and is denoted as $\langle k\rangle$. The formula (1) for the average degree is as follows:

$$\langle k\rangle=\frac{\sum_{i=1}^{N}k_i}{N} \tag{1}$$

where N is the total number of nodes and k_i is the degree of the i th node. The average degree is an important indicator of the network structure, which helps us to understand the average level of connectivity of the nodes in the network, as well as the overall denseness of the network.

The degree distribution indicates how the degree of a node is distributed throughout the network. The degree distribution is usually represented using a probability mass function or a probability density function. For an undirected network, the probability mass function of the degree distribution can be expressed as equation (2):

$$P(k) = \frac{N_k}{N} \tag{2}$$

where $P(k)$ is the probability that a node has degree k, N_k is the number of nodes with degree k, and N is the total number of nodes.

(2) Clustering coefficient

The clustering coefficient is a measure of the degree of clustering of nodes in a network, which describes the density of relationships between nodes in the network. Specifically, the clustering coefficient measures the relationship between the proportion of actual connections between a node's neighbors and the maximum number of possible connections. It measures how tightly connected the friends of the nodes in the network are, i.e., how many pairs of nodes in the neighborhood of a node with degree k are connected to each other.

The clustering coefficient can be expressed in equation (3):

$$C_i = \frac{2E_i}{k_i(k_i - 1)} \tag{3}$$

where E_i is the number of edges that actually exist between neighbors of node i and k_i is the degree of node i.

(3) Average path length

The average path length is the average length of the shortest paths between nodes in a network, which is used to characterize the global connectivity and information dissemination efficiency of the network. Specifically, for a network, its average path length L is defined as the average of the shortest path lengths between all pairs of nodes. It can be expressed in equation (4) as:

$$L = \frac{2}{N(N-1)} \sum_{i>j} d_{ij} \tag{4}$$

where N represents the total number of nodes and d_{ij} is the shortest path length from node i to j.

II. A. 2) Classical Network Information Dissemination Models

The SI, SIS and SIR models are three fundamental and widely used theoretical models in the study of knowledge dissemination and infectious disease modeling in complex networks. These models help us understand how knowledge, disease or information spreads through a population by simplifying the real-world propagation process. The following is a further description of these three models.

(1) The SI model

The SI model is an infectious disease model that describes the basic dynamics of spreading in a population, in which an individual only recovers after being infected without acquiring immunity, and therefore can become susceptible again after recovery.

The SI model represents two basic categories: susceptible and infected.The SI model describes the interconversion between susceptible and infected individuals based on differential equations. Equation (5) is the differential equation of the SI model:

$$\begin{cases} \dfrac{dS}{dt} = -\beta \cdot \dfrac{SI}{N} \\ \dfrac{dI}{dt} = \beta \cdot \dfrac{SI}{N} \end{cases} \tag{5}$$

where S is the number of susceptible individuals and I is the number of infected individuals. N is the total population $N = S + I$. β is the transmission rate, which represents the rate at which an infected person transmits the disease to a susceptible person per unit of time. These two differential equations describe the decrease in susceptible persons and the increase in infected persons. A susceptible person is infected with probability β per unit time of contact with an infected person. Thus, the rate of decrease of susceptible persons is proportional to the number of infected persons and the number of susceptible persons. The rate of increase in susceptibles is related to the rate of infection because each infected individual is able to infect others per unit of time.The main feature of the SI model is that an infected individual becomes susceptible again after recovery, so there are no recovered or immunized individuals in the model [17]. This makes the SI model more applicable to some diseases, such as influenza, where there is no lasting immunity after infection.

(2) The SIS model

The SIS model considers the situation where an infected person becomes susceptible even after recovery.The name of the SIS model stands for two basic categories: susceptible and infected. In the SIS model, an infected person does not have lasting immunity after recovery, but becomes susceptible again.

The differential equations of the SIS model describe the intertransformation between the susceptible and the infected. The following is the differential equation of the SIS model:

$$\begin{cases} \frac{dS}{dt} = -\beta \cdot \frac{SI}{N} + \gamma \cdot I \\ \frac{dI}{dt} = \beta \cdot \frac{SI}{N} - \gamma \cdot I \end{cases} \quad (6)$$

where β is the rate of transmission, which represents the rate at which an infected person transmits the disease to a susceptible person per unit of time. γ is the rate at which an infected person recovers and becomes susceptible again. These two differential equations describe the interaction between susceptible and infected individuals. The rate of increase in susceptibles is related to the rate of infection, and the rate of decrease is related to the rate of infection and the rate of recovery.

(3) The SIR model

The SIR model considers three basic categories: susceptible, infected, and recovered. In the SIR model, once an individual recovers, he or she has lasting immunity and is no longer infected.

The differential equations of the SIR model describe the intertransformation between susceptible, infected, and recovered individuals. The following is the differential equation of the SIR model:

$$\begin{cases} \frac{dS}{dt} = -\lambda \cdot \frac{SI}{N} \\ \frac{dI}{dt} = \lambda \cdot \frac{SI}{N} - \gamma \cdot I \\ \frac{dR}{dt} = \gamma \cdot I \end{cases} \quad (7)$$

where S is the number of susceptible individuals, I is the number of infected individuals, and R is the number of recovered individuals. N is the total population and $N = S + I + R$. λ is the transmission rate, which represents the rate at which an infected person transmits the disease to a susceptible person per unit of time. γ is the recovery rate, which represents the rate at which an infected person recovers and becomes recovered per unit of time.

II. B.Study of the Improved SIRI Information Dissemination Model for Safety Education Knowledge

II. B. 1) SIRI model

Based on this SIR model, the SIRI model is proposed by considering that during the propagation of information, the final immune state R will not become an absorbing state, and the nodes in the R state will be transformed again with a certain probability into the propagation state I. The SIRI model is shown in Fig. 1.

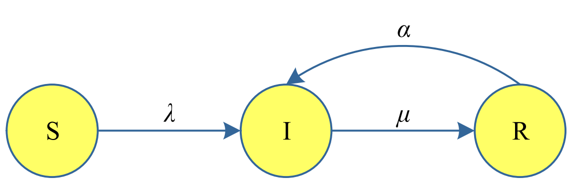


Figure 1: Model of SIRI

In the SIRI model, all the individuals in the network system are also divided into three states susceptible state S, infected state I and immune state R, comparing to the SIR model, there is no increase in the type of nodes. The transition from state R to state I is added to the propagation model, in the system network, the probability that the susceptible state S is infected into state I is λ, the probability that the infected state I is transformed into state R after a certain period of time is μ, and the probability that a node in the immune state will become the propagated state I again due to its own reasons or due to external reasons is α. The corresponding S-state, I-state and R-state individual densities at moment t of the system are $s(t)$, $i(t)$ and $r(t)$, respectively. The corresponding set of equations for the dynamics of the SIRI infection is:

$$\begin{cases} \dfrac{ds(t)}{dt} = -\lambda s(t) \\ \dfrac{di(t)}{dt} = \lambda s(t) - \mu i(t) + \alpha r(t) \\ \dfrac{dr(t)}{dt} = \mu i(t) - \alpha r(t) \end{cases} \tag{8}$$

II. B. 2) Improved SIRI propagation models

The mode of information dissemination in the network and the mode of infectious disease dissemination have similarities, but there are also many differences, the differences are mainly reflected in the following points:

(1) When the users in the network browse as well as come into contact with the information may become the spreader, or ignore the information to become the immunizer of the information, it will lead to the interruption of the information, and no longer continue to be spread on. Therefore the immune state of the node needs to be considered on the nodes of the social network.

(2) Users on the network will produce a series of propagation behaviors after contacting or browsing the information, such as forwarding, commenting, liking, favoriting, or even directly ignoring. The reason why there will be different reactions is affected by many factors, such as the interrelationships in the network structure, the size of a user's social circle, the media's guide and the government's intervention, but also by the influence of the spread of information on other social platforms, for example, a user did not make any reaction in the social circle after browsing to the information on the social network, and when this kind of information is also spread in the circle of friends, Tik Tok, Today's Headlines, and the real life and other social networks, due to the influence of other platforms this user for this information will again pay attention to, may be in the social network to disseminate information, to carry out certain comments or forwarding and other dissemination behavior.

According to the characteristics of information dissemination, for the above differences with the infectious disease model, information dissemination nodes in social networks can be divided into three states:

(a)State S ---- information unknown, the user did not receive the information.

(b)State I ---- information disseminator, the user receives the information and disseminates it.

(c) State R ---- information ignorer, the user receives the information and ignores it without any dissemination behavior.

The SIRI information dissemination model is shown in Figure 2.

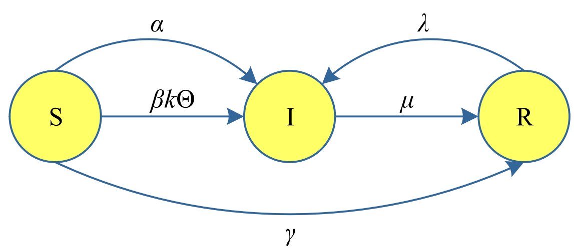


Figure 2: Model of SIRI information dissemination

Therefore construct the equation for the dynamics of information dissemination in social networks:

$$\begin{cases} \dfrac{ds_k(t)}{dt} = -\beta K\Theta(t)s_k(t) - \alpha s_k(t) - \gamma s_k(t) \\ \dfrac{di_k(t)}{dt} = \beta K\Theta(t)s_k(t) + \alpha s_k(t) + \lambda r_k(t) - \mu i_k(t) \\ \dfrac{dr_k(t)}{dt} = \gamma s_k(t) - \lambda r_k(t) + \mu i_k(t) \end{cases} \tag{9}$$

The formula $\Theta(t)$ denotes the probability that a random edge chosen in the social network points to a contagious node connection in the network at time iteration number t.

$$\Theta(t) = \frac{\sum_k kP(k)I(k,t)}{\langle k \rangle} \tag{10}$$

where, k denotes the incidence of infectious nodes in the network, $P(k)$ denotes the degree distribution function in the simulated social network, and $\langle k\rangle$ denotes the average degree of the nodes on this social network. $s_k(t)$ denotes the density of k information unknowns at moment t, $i_k(t)$ denotes the density of k information disseminators at moment t, $r_k(t)$ denotes the density of k information ignorers at moment t, α denotes the rate of spontaneous dissemination affected by the external environment, β denotes the rate of spontaneous dissemination probability of propagation influenced by the information dissemination nodes in the social network, γ denotes the probability that information unknowns do not react to the information after being exposed to the information and turn into information ignorers, μ denotes the probability that information disseminators will not disseminate the information after a certain period of time and thus ignore the information, and λ denotes the probability that information ignorers are affected by the information on other social platforms and turn into information disseminators [18].

The transition rules between nodes are described as follows:

(a) The sum of the densities of nodes in the states of information unknown, information propagator, and information ignorer is 1, i.e., $s_k(t)+i_k(t)+r_k(t)=1$.

(b) If a node in state S comes into contact with a node in state I in the network, it will transform into a propagating node I with a certain propagation probability β. The β is called the internal network influence probability.

(c) A node in state S, although not exposed to the influence of propagation node I, will be subjected to real-life interpersonal exchanges, external media reports to obtain information, and with a probability α from unknown state S to propagation state I, α is called the probability of influence of the external society.

(d)A propagation node will no longer propagate the information after propagating the information because of the loss of freshness to the information, the authenticity of the information, or the current heat of the information, and the propagation node is transformed into an information ignorer with a certain probability μ, and μ is known as the probability of immunity.

(e) An unknown node although through the network information dissemination or the influence of external factors, but because of no interest in the information or information unrelated to their own, and ignore the information will not be disseminated for the information, and with a probability of γ transformed into an information ignorer, then γ is called the direct immunity probability.

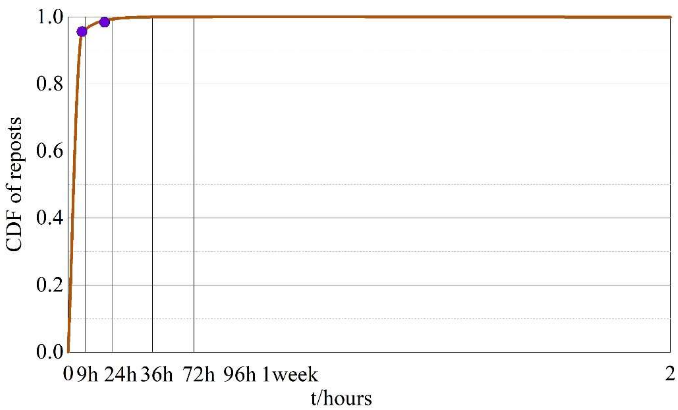
(f) in the social network information ignorer no longer carry out the dissemination of information, but for this node, at the same time, will be in WeChat, Tik Tok and other social networks to obtain a certain amount of information, with the dissemination of information in the multi-network, the hotness of the information continues to increase, the information ignorer will once again carry out the forwarding of the information or comment on the information, information ignorer to the probability of λ transformed into an information redisseminator, λ is called the external network influence probability.

III. Experimentation and analysis

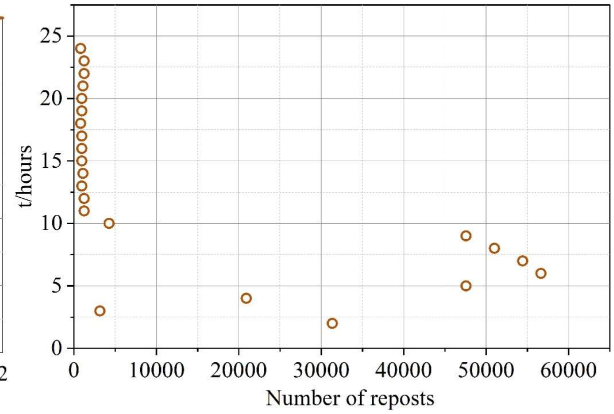
III. A. Analysis of Social Network Topological Properties

One tweet was selected from a variety of national security education tweets captured on Twitter and its retweet count was used to demonstrate the effectiveness of the improved proposed SIRI model. This tweet affected a large number of users and generated 335936 retweeters. The temporal distribution of the number of infected retweeters is shown in Figure 3 (Figure a shows the cumulative number of infected retweets, and Figure b shows the change in the number of infected retweets over 24 hours). From the figure, we can find that the process of spreading the message occurred mainly on the first day. It generated 325622 retweets in 24 hours. The number of retweets gradually stabilized at the number of 337,261 in the subsequent hours, which accounted for 96.8% of the retweets in the first 24 hours. Therefore, it is true and reliable for us to analyze the model validity based on the data of the first 24 hours.

According to the change of the number of retweets of this tweet at each time, we can obtain the change of the number of retweets every 60 minutes in 24 hours (for the convenience of the study we use 60 minutes as the interval of the change of the number of retweets) where the change of the number of ordinary retweets corresponds to the change of the ordinary infected state I in the improved SIRI model, and the change of the number of the popular retweets therein corresponds to the model's super-spreader A-state Variation. In order to combine the real scenario and the mathematical model, we roughly distinguish the ordinary forwarders as state I and the popular forwarders as state A, assuming that the popular forwarders exhibit super-spreading properties.



(a) The accumulation of the number of infections



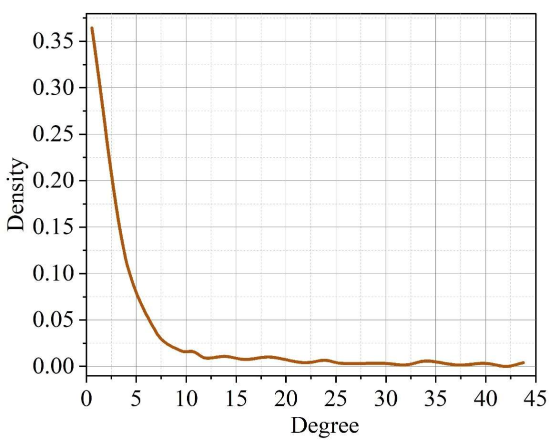
(b) The repost number within the first 24 hours

Figure 3: The time distribution of infected forwarding users

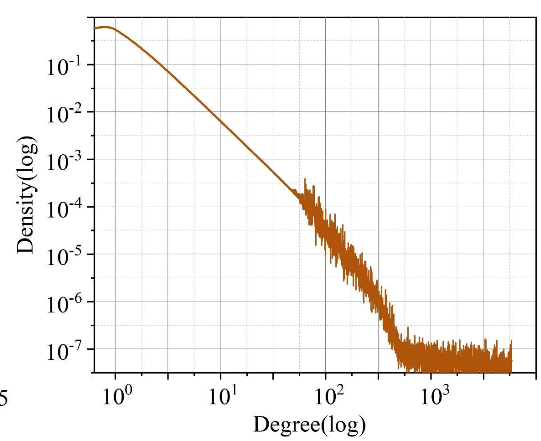
In order to find the most appropriate parameters for the model in this paper to characterize the real-world propagation of the message of this tweet and to compare its performance with the classical SIR model, we provide an objective function:

$$\sigma = \sum_{1}^{n} \left| I(t) - \hat{I}(t) \right|^{2} \tag{11}$$

where $\hat{I}(t)$ is the fitted value of $I(t)$ (the value of the real record) at moment t, and the corresponding n represents the number of records. In addition, in order to simulate the network connectivity of social networks, a network structure without scale properties is used. The network structure topology demonstration and degree distribution demonstration are shown in Fig. 4 (Fig. a represents the degree distribution in a 1000-point network, and Fig. b represents the degree distribution in a 600,000-node network structure). Figure (a) shows that has enough scale-free degree characteristics to match the real network. Figure (b), on the other hand, shows the degree distribution generated for this network with 600,000 nodes, which presents a regular distribution with an approximate power rate. It also has a long tail similar to the real network (representing the presence of users with a very small percentage of nodes with a large degree). Such a degree distribution also indicates that the majority of users in the network influence a relatively small proportion of other users, while the vast majority of users are influenced by a small proportion of them. In addition, according to the generated degree distribution, we take the large degree node as the part that occupies 0.00626% of the whole node, so we take $\overline{k_1}$ =3.33 and $\overline{k_2}$ =536, whereas, by studying the magnitude of the number of followers of the microblogging users of the network, we take the network's total followers as the The average value is taken as $\overline{k}$ =20.6.



(a) The degree distribution of the 1000 nodes



(b) The distribution of the network structure of 600,000 nodes

Figure 4: The topology of the simulation network and the degree distribution

III. B. Simulation of the dissemination of knowledge on safety education

The graph of the proportion of the number of people in each state over time when the method of this paper is not taken is shown in Figure 5, which shows the proportion of the number of users in each state in the social network over time. From the figure, it is easy to find that the proportion of the number of infected people rises after the release of the relevant safety education knowledge and reaches a peak of 0.5342 at the moment of t=0.8733, after which the number of transmitters declines and finally disappears. On the other hand, the proportion of susceptible and immunized people showed a monotonically decreasing and increasing trend, respectively, and its rate of change first increased and then decreased, which was correlated with the proportion of infected people.

The graph of the change of the proportion of the number of people in each state over time when adopting the method of this paper is shown in Fig. 6. By observing the graph, it is found that after applying the model of this paper, the scale of diffusion of national security education knowledge decreases significantly, and the trend of the number of susceptible and immunized people is similar to that of Figure 5, but the speed of its change shows a significant change, which is due to the change in the number of disseminators.

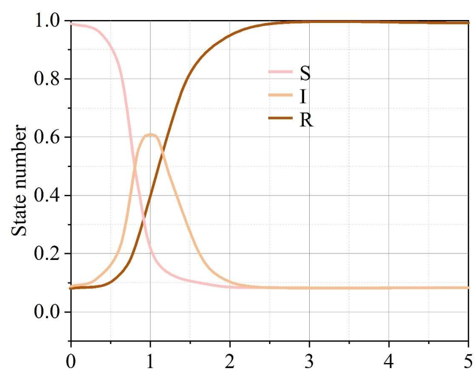


Figure 5: No change in the proportion of each state in this article

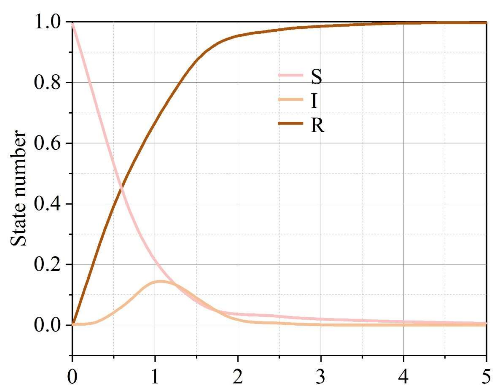


Figure 6: The ratio of the number of states in this method is used to change the chart

In order to further study the impact of this paper's model on the dissemination of national security education knowledge, this paper makes a graph to analyze. The graph of the proportion of the number of infected states over time before and after applying the method of this paper is shown in Figure 7. As can be seen from the figure, after the use of this paper's model, the peak value of the dissemination of national security education knowledge declines, the number of infected people slows down the rate of change, but the security education knowledge does not disappear rapidly, this is due to the number of infected people decreases, the rate of their conversion into immunized people also decreases accordingly, the proportion of the number of infected people over a long period of time will maintain a slow decrease and constantly tends to the state of zero.

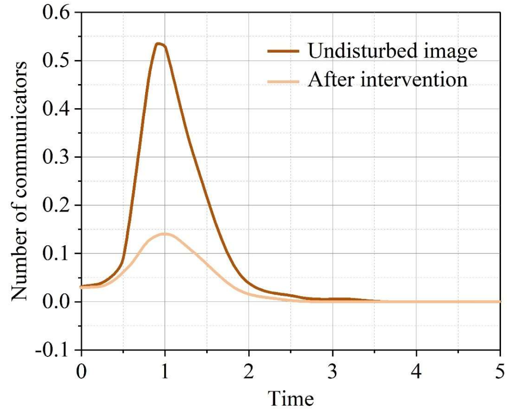


Figure 7: The proportion of infected states is changed at any time

IV. Optimizing the dissemination of knowledge on national security education

With the advent of the digital era, digitalization has transformed the basic form of existence of objects from atoms to bits. Compared with audiovisual media, digital media has stronger immediacy, decentrality, interactivity and immersion, and can meet personalized and intelligent needs in information dissemination with the help of big data and algorithms, providing new technology and possibilities for the enhancement of the dissemination power of national security education, and promoting the dissemination of national security education for all. National security education information spreads to cyberspace through digital media, forming a mapping between physical space and virtual space. At the same time, social facts about national security are also digitally interpreted in real time, presenting a clear picture of national security knowledge to the nation.

In the new media era, the communication mechanism of national security education has opened up a new information dissemination mechanism on the basis of the previous elite communication and mass communication, and the national security education can realize the value function of the "7W" communication model through digital media. On the basis of the "5W" communication model, the "7W" communication model attaches importance to the communication scenario and communication purpose. The "7W" propagation mode elevates the traditional one-way linear propagation to a controlled propagation, forming a chain-like relationship network. First of all, digital media has made information dissemination no longer limited by physical spaces such as cities, regions, and natural geographical conditions, and has promoted the universal coverage of national security education and dissemination. Second, digital media has built an open, transparent and efficient information exchange platform for the country and its citizens, such as social media and mobile applications such as "two micro and one end", Douyin, etc., and the state can use digital media to disseminate diversified national security education information, enhance the national security awareness of the whole people through different narrative forms, observe data, and understand the feedback of the whole people. At the same time, citizens can understand, forward, and discuss issues related to national security education anytime, anywhere, and at almost zero cost through digital media platforms. Finally, with the support of big data analysis, algorithms and other technologies, digital media can push customized national security education content according to individual behavioral preferences and geographical locations, which can not only optimize the audience experience, but also enhance the attractiveness and pertinence of national security education.

The digital medium has not only further expanded the communication power of national security education, but also reshaped the communication power of national security education. “From the early one-way linear communication to two-way circular communication to social system communication, the communicator has always been in the main position and played the main role. With the diversification of communication media, the role and positioning of the recipients are also shifting.” The universalized dissemination of national security education has led to a deep interaction between the State and the nationals, in which the State and the nationals share the dual roles of communicator and audience in this dissemination mechanism, and this two-way interaction has also meant that the degree of consensus between the State and the nationals on national security education has developed into a fusion relationship.

V. Conclusion

Through the study and simulation analysis of the complex network-based SIRI dissemination model, it is found that the dissemination of national security education knowledge in social networks presents obvious explosive and time-sensitive characteristics. The data show that the number of microblog retweets reaches 325,622 times in the first

24 hours, accounting for 96.8% of the total retweets, indicating that the dissemination of information is mainly concentrated in the early stage of publication. The model simulation results show that when no optimization measures are taken, the proportion of the number of communicators reaches a peak of 0.5342 at the moment of t=0.8733, while after adopting the method of this paper, the peak value decreases significantly and the dissemination speed slows down, but the duration of dissemination is prolonged, which is conducive to the in-depth dissemination of national security education knowledge.

The optimization path of national security education knowledge dissemination is mainly reflected in three aspects: first, the digital media has broken through the physical space limitations and realized universal coverage; second, the social media platform provides two-way interaction channels between the state and the nationals, forming the “7W” communication mode, upgrading the traditional one-way linear communication to controlled communication; third, the personalized content push supported by big data and algorithm technology improves the pertinence and effectiveness of dissemination. Third, personalized content delivery with the technical support of big data and algorithms has improved the pertinence and effectiveness of dissemination.

The communication mechanism of national security education in the digital era has developed from elitism and popularization to universalization, with the state and nationals playing the dual roles of communicator and audience in the communication process. This mode of communication involving all people not only expands the communication power of national security education, but also reshapes the communication structure, promotes the in-depth integration of the security awareness of the state and the nationals, and provides new possibilities for the construction of a national security education system for all people.

Funding

This work was supported by National Social Science Fund Youth Project (Project No: 24CKS118); Tianjin Normal University Campus Project (No: 52WT2237).

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