

Multidimensional Analysis Model for Network Information Dissemination

Cong LIU^{1, a}

¹Information Technology Center, Tsinghua University, Beijing, 100084, China

^aemail: liuc@tsinghua.edu.cn

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Abstract. With the rapid development of social information technology and the rapid expansion of information quantity, every day people have to face a wide range of information resources. How to use these resources with high frequency, high efficiency and high quality, and how to better play the advantages of network information dissemination, is an urgent problem to solve. Therefore, we proposed a multidimensional analysis model for network information dissemination based on Lasswell's communication model. First, through the elaborate analysis of Lasswell's communication model, we presented a network information communication model. Then, through definition and research on information ecology model of cyberspace, multidimensional attributes of dissemination, multidimensional attributes of information, and multidimensional attributes of evaluation, we constructed a three-dimensional space of information dissemination analysis consisting of information dissemination, information attribute and information evaluation. Finally, combined with the example of university network information dissemination, we described the application of the proposed model, in order to provide practical reference for network information dissemination analysis and to make network information dissemination effect work better.

Introduction

In the information age, along with the development of computer and communication technology, network has become the main media of social information dissemination and communication. Network has owned digitization, large capacity, timeliness, two directivity, cross time-space and other characteristics, and these characteristics determine that the network has incomparable advantage in information dissemination, such as freedom, timeliness, pluralism, overlapping, complementarity, and so on. Network information dissemination is an indispensable human information communication activity in the complex social system, has gradually become the main channel for information exchange in the world, and plays an important role in promoting the social development.

Network information dissemination has changed the concept, idea and methods of traditional information communication, and has promoted the information dissemination development towards high quality, high efficiency from the perspective of communication methods and technology. In the network information dissemination, information dissemination effects directly affect the objectivity and authenticity of information received by the audience, and then affect the information utility to play. Many scholars [1][2] have analyzed from different perspectives on the content and mode of network information dissemination, influence factors of network information dissemination effects, ethics and legal rights of network information dissemination, etc. But these researches have focused on network information dissemination process and its influence factors, and connotation, level and effect evaluation of network information dissemination is still lack of systematic and comprehensive studies. Therefore, we defined information ecology model of cyberspace, multidimensional attributes of dissemination, multidimensional attributes of information, and multidimensional attributes of evaluation. Then, we proposed a network information communication model based on Lasswell's communication model and three-dimensional space construction of information dissemination analysis based on information ecology model of cyberspace.

Lasswell's Communication Model

The model was developed by American political scientist and communication theorist Harold Lasswell in 1948 while he was a professor at Yale Law School. The model not only for the first time more scientifically analyzed communication process, and for the first time more completely divided the field of communication research. The model is Who-Says What-In Which Channel-To Whom-With What Effect, which is a rectilinear communication model.

With the development of network technology and information technology, the traditional information dissemination has undergone a fundamental change, and dissemination techniques and methods have played a decisive role. Based on Lasswell's communication model, we proposed a network information communication model as shown in Fig.1.

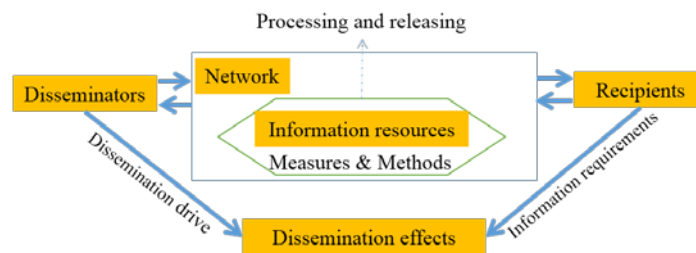


Fig.1. Network information communication model

Multidimensional Analysis Model for Network Information Dissemination

Information Ecology Model of Cyberspace. Information ecology model of cyberspace Γ can be presented as a formal quadruple. The definition of Γ is as follows:

$$\Gamma = (C, P, T, E) \quad (1)$$

C represents information content. Information content is the modules to organize information and to construct information units, which is the basis of the network information ecological environment and is the object elements of information ecology system.

P represents information person. People are the main body of the network information ecological environment, and are the dominant factors of information ecology system.

T represents information technology. Information technology is an important bridge between information person and information content in the network information ecological environment, and is the support power for information person to obtain information.

E represents information environment, which is the basis for the existence of the network information ecological environment.

Multidimensional attributes of Dissemination. The development of network technology and information technology greatly promoted the information dissemination of network media. Network information dissemination has brought the globalization of communication and the diversification of feedback. The process of network information dissemination has the following characteristics:

- From the single recipient role in the traditional one-way communication to the fusion of dissemination and recipient in the bidirectional or multi-way communication.
- From information push of the disseminators to information pull of the recipients.
- From the original single acceptance function to having multiple rights.
- From the interaction between dissemination and acceptance to the interdependence between the two.

In the whole complex system of information dissemination and application, there are many influence factors, and each influence factor has an interference effect. Analysis on the multidimensional attributes of information dissemination, such as disseminators, recipients, scene, and so on, is applicable to revealing the real situation using the local and overall information in information organization management, in order to better achieve disseminators pursuing communication effect and recipients meeting information needs.

Multidimensional attributes of information. The nature of information can be called information

attribute [3]. According to the complex network theory [4], the interface information can be considered as a complex network system, including information entity, information correlation and information macrocosm.

According to the three forms of information, the information attributes are divided into entity attribute, association attribute and time attribute. Fig.2 describes the visualization mapping relationship of information multidimensional attributes. The information is encoded into visualization graphical mapping and visualization structure mapping.

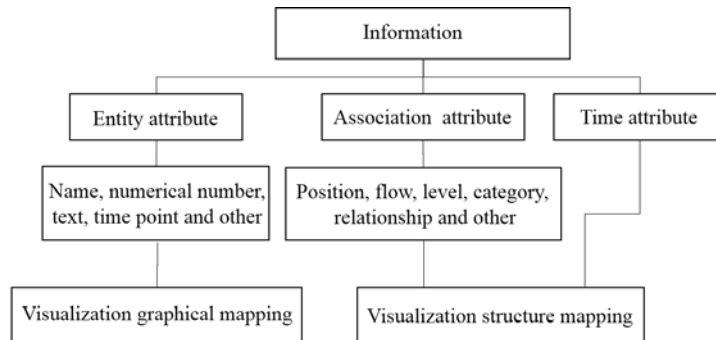


Fig.2. Visualization mapping relationship of information multidimensional attributes

Depending on the different types of information multidimensional attributes, we can respectively establish the visualization mapping relationship. The visualization structure of information is divided into six categories, including listing structure, coordinate structure, tree or net structure, spatial (geographic) position structure, time flow structure and multi-structure nesting/fusion. The details are shown in Table 1.

Table 1 The classification of visualization structure

Attribute type	Description	Classification of visualization structure
Hierarchical attribute	Information packet, classification and other associated attributes	Listing structure
	Degree, numerical number and other comparison attributes	Coordinate structure
	Hierarchical relationship attribute, important degree relationship and effect association attribute	Tree or net structure
	Spatial orientation attribute, distance association attribute	Spatial (geographic) position structure
Time series structure	Association attributes with the time change	Time flow structure
Composite structure	Association attributes of different categories present simultaneously	Multi-structure nesting/fusion

Multidimensional attributes of evaluation. Compared with the traditional information dissemination effect, network information dissemination effect has rich connotations, complex levels and prominent characteristics. Meanwhile, in the network environment, the interaction, participation and clear objectives of information audience in the process of acquiring information determines that network information dissemination effect mainly depends on participation degree of information exchange and satisfaction degree of information needs for audience. Therefore, only based on the effects of cognitive level, emotional attitude level and behavioral level brought by network information dissemination to audience, and the dynamic tracking evaluation of the short, medium and long-term dissemination effects, we can comprehensively, objectively, and scientifically evaluate dissemination effects of network information.

According to the characteristics and hierarchical structure of network information dissemination effect, based on behavior of information audience in the network information dissemination, the evaluation model of network information dissemination effects shown in Fig.3 can be constructed by network media contact behavior of information audience, and awareness degree, understanding degree and support degree evolved on the basis of audience behavior.

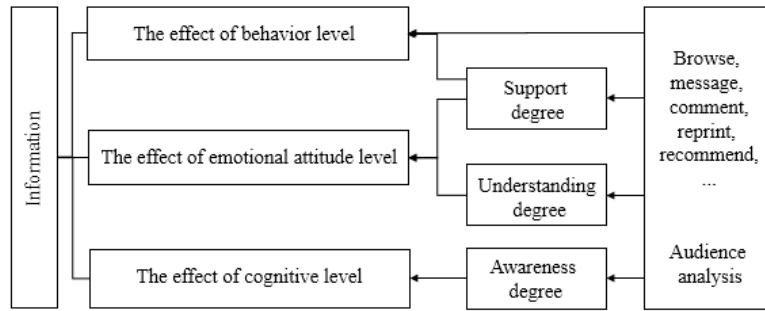


Fig.3. The evaluation model of network information dissemination effects

Multidimensional Analysis Model for Network Information Dissemination. In the network information dissemination process, disseminators and recipients pursue sending-receiving utility. Disseminators seek communication goals to realize communication intention for the expected effect. Recipients use their own conditions to obtain appropriate useful information content for satisfying their information needs. The utility interaction is inevitable and stable relationship in the objective for any network information dissemination. Therefore, the utility principle has become an important part of network information dissemination.

There are three kinds of pursuit in the process of network information dissemination: information pursuit as quickly as possible, information quantity pursuit as much as possible, and information value pursuit as high as possible. This is the common pursuit under the interaction of dual subjects, and is the fundamental inherent mechanism to constantly improve network information dissemination. Thus, we construct a three-dimensional space of information dissemination analysis shown in Fig.4 consisting of information dissemination, information attribute and information evaluation, realizing the harmony unification of the three, improving the network information ecological system, and promoting its sustainable development.

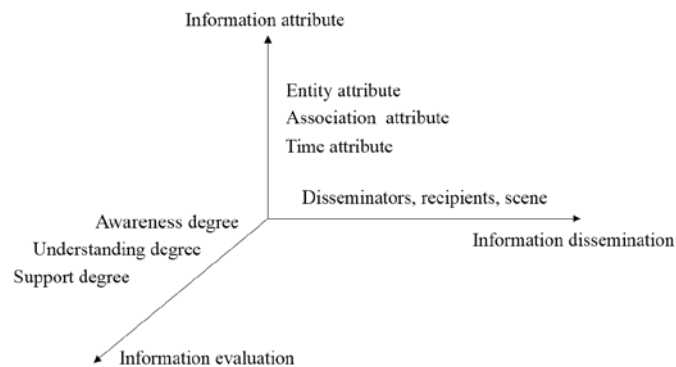


Fig.4. Three-dimensional space construction of information dissemination analysis

Case Study

Here we will take network information dissemination in universities as an example to analyze. In this paper, we suggest that network information dissemination in universities is a process to achieve information exchange and sharing using network technology to transfer digital information, which refers to the university campus for the polymerization-spot, regards university staff and students as the main consuming body, and considers university campus network the main body participated and created as the carrier. It is a two-way communication the main consuming body through the campus network involves in work, learning, communication, entertainment and other activities.

From the dimension of information dissemination. In essence, network information dissemination process in universities is a kind of information communication using Internet activities between the communication subject and the acceptance subject in universities. The communication content is the campus network information, including teaching, learning, information search, daily communication, life services, student management and other digitization

of function integration. At the same time, network characteristics makes the scope of information acquisition and communication break the regional gap and out of the campus boundaries, forming more immediate social impact. Coupled with the campus network in the high involvement for educators and students, the campus issues will take to achieve the network and socialization dissemination, so its repercussions spread deeper than the traditional media.

The propaganda service work in university is multi-level and diversified. Accordingly, the way to achieve propaganda service is also multi-channel and multifarious. For the departments, they require their homepages have the ability to support integration management including internal and external propaganda and service. For units, external services also need consider the convergence of business systems. For the scientific research institutions, they need build a service platform based on integration of internal and external website with functionalities such as information publishing, affair management and so on. Fig.5 is the analysis of university network information dissemination from the dimension of information dissemination.

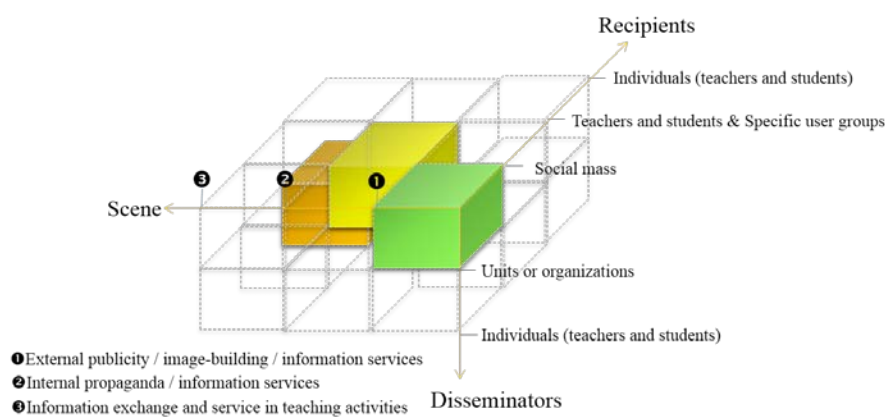


Fig.5. Analysis of university network information dissemination from the dimension of information dissemination

From the dimension of information attribute. According to the characteristics of information association attribute, we design the scheme of visualization structure. Information architecture for ordering information is coordinated and functional. Information decryption can effectively display of the information content, style and features, allowing users to perceive the information structure in the existing information, to get information conveniently, and to satisfy their information needs for their goals.

Extracting information structure, adopting the form of information expression, and scientifically expressing information content, makes the formation of information structure help speed up information transmission and ensure the efficiency of information transmission. The construction of information structure should be consistent with the user's reading and browsing habits, and orderly display information content. Due to the huge amount of information and unstructured, nonlinear access methods and other reasons, we should also consider the user's information environment and information capabilities.

From the dimension of information evaluation. The digital essence of network information dissemination can easily achieve real-time analysis and statistics of its dissemination data [5]. Therefore, based on the perspective of technology implementation and operational evaluation, we can through a number of statistical indicators and elements of computer network obtain effective evaluation data between contact behavior of network media for information audience and the three indicators including awareness degree, understanding degree and support degree. In the computer system, network dissemination information are stored in the network servers, and the audience calling any information shall obtain the server license, which are recorded in the server log management, including access time, IP address of visitors, geographical location, browser, operating system, etc. These logs and records provide objective, accurate data evaluation for the effective evaluation of network information dissemination effect. The understanding degree and the

support degree can be embodied in the messages or comments of information audience, and also can be obtained through online survey methods to get timely evaluation data.

Technical framework. Through the above analysis, we can see that a single platform cannot well satisfy the above requirements. Therefore, we need to establish an integrated platform to fully support the various propaganda services in university. The platform can support multi-mode management for responsible units to autonomously build their personalized websites, can achieve synchronization, push and correlation of all kinds of information, can be well integrated with other kinds of application platforms in university, and can ultimately achieve diversity, flexibility and consistency of propaganda service construction in university. The system function diagram is shown in Fig.6.

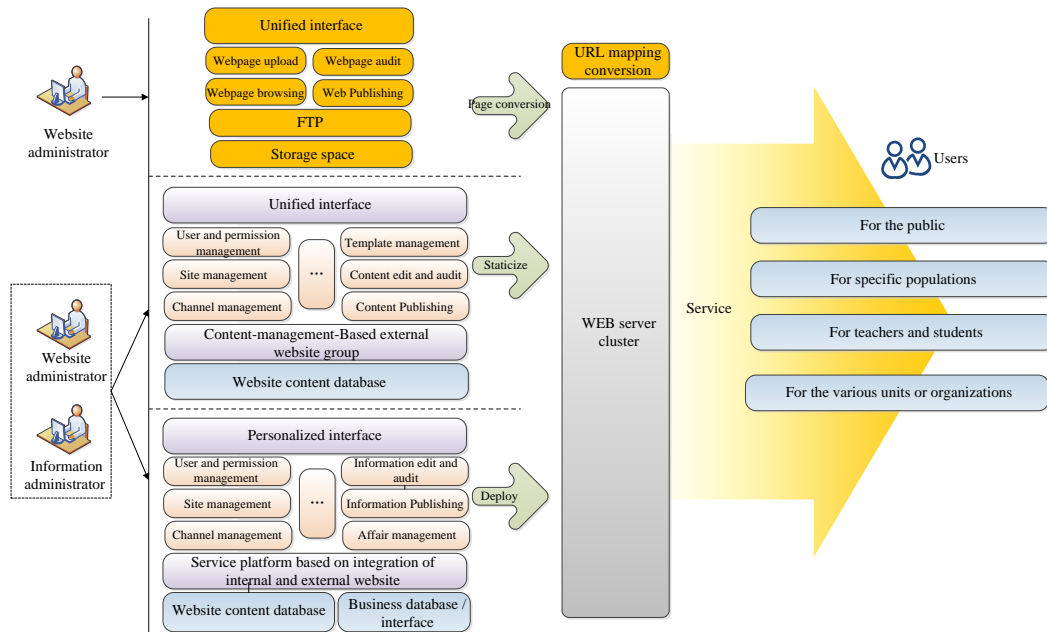


Fig.6. System function diagram

Conclusion

As a new communication activities, network information dissemination has profound complexity, and its effect is more issues worthy of exploration. Thus, there needs more research personnel involved, the introduction of new technology, new research methods, making communication effect studies keep up with the pace of communication practice.

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