



EVALUATION FOR INFORMATION UTILIZATION RATE OF EMERGENCY WEBSITE -- BASED ON TECHNOLOGY ACCEPTANCE MODEL

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Abstract

Incidents such as natural disasters, accident disasters and health safety that occur every year seriously threaten human health and life safety. The Internet has the characteristics of openness, timeliness, and wide audiences that are different from traditional media, making it an important channel for the public to obtain information on emergencies. Emergency websites play an important role in the release, dissemination, communication, and feedback of disaster information. Therefore, it is very important to understand the necessary factors that affect the people's actual use of emergency website information. Based on the original TAM model, this study added two external variables of information quality and interactive experience, and used the mature structural equation model to construct, modify, and empirically test the model. Finally, this article analyzes the factors that affect users' utilization of emergency website information based on the model path, in order to provide references and suggestions for the release of government website information in response to major public health emergencies in the future.

Keywords: emergency website, information utilization, TAM

Introduction

In the 21st century, with the continuous improvement and development of human society, the development of human society is increasingly diversified. And with the increasingly prominent contradictions between human and

environment as well as within society, public crisis events and natural disasters occur frequently. Governments have successively establish government emergency websites and provide various kinds of emergency services to the public through the website. As a bridge of communication between the government

and users in emergency management, the emergency website is the main source for users to obtain emergency information and learn how to deal with emergencies, and it is also the key to determine whether the emergency management can be carried out smoothly.

In order to successfully disseminate disaster information, it is important to understand the necessary factors affecting the use of people's information about the emergency website. Research on information utilization rate of emergency website can help to identify factors that have an impact on utilization efficiency. On the one hand, it can prompt the network users to obtain and utilize disaster information. And on the other hand, it helps to improve the government information release rules under major emergencies, enhance the modernization of government governance ability, and further enhance the utilization value of emergency websites. This article established theoretical model on the basis of summarizing the factors affecting the information of the user's access to emergency website, obtained data by questionnaire survey, and finally used the structure equation model to test the proposed model. This paper hopes to provide references and suggestions for government website information release in response to major public health emergencies in the future by analyzing the factors affecting the use of people's information about the emergency website.

Conceptual Model Building

Behavioral Research Model

Currently the most widely used model for behavioral research is Davis' technology acceptance model (TAM).

Davis pointed out that behavior intentions is determined by the user's attitude toward information technology, and the attitude is determined by the user's two beliefs about information technology, namely Perceived Usefulness and Perceived Ease of Use. Davis also demonstrated the application of specific environment through the establishment of the model. This model establishes two basic intermediate variables, Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU), while other factors are collectively referred to as external variables. External variables further influence the attitude towards use, behavior intention, and actual use by affecting the two intermediate variables of perceived usefulness and perceived ease of use.

The TAM model has achieved good results in the application of a large number of empirical studies, and has been widely accepted by the academic community and constantly verified and cited in various research fields. The current scholars' research on the TAM model can be summarized into two types. The first is based on the technology acceptance model combined with other related theories or models to conduct empirical research on user behavior. For example, integrating the TAM model with the innovation diffusion theory, Karavasili (2010) studies the user adoption activities of e-government. The study found that compared with trust and perceived risk, the degree of personal innovation, compatibility, and relative advantage are more predictive of users' usage intentions. The other is based on the technology acceptance model and focuses on the investigation and study of external variables. For example, Yong-Mi Kim (2010) used the technology acceptance model to conduct a multi-group analysis on three groups

of undergraduates, postgraduates, and doctoral students. The results of the study demonstrated the positive impact of two external variables on the intention of use behavior. Aiming at a private website that provides COVID-19 information in Indonesia, Kurniasih et al. (2020) based on TAM analyzed the factors that affect Indonesians' acceptance of the website by introducing actual system use.

The selection of external variables in the technology acceptance model depends on different research environments. So far, many scholars, institutions, and organizations have selected different perspectives to evaluate the website. For example, Jim Kapoun (2009) evaluated the website from the coverage, accuracy, timeliness and usability of the website information. Argus Clearinghouse web (2015) comprehensively evaluates the website from the information quality, content level, navigation design, and organizational structure of the website resources. Jon Taylor (2001) made a comprehensive evaluation of the website from the aspects of website content quality, structure, technology, style, etc. The Australian National University (2018) evaluates the website from the three dimensions of website content quality, organization and design.

In this research environment, the essence of using emergency website information is the process of interaction between people and emergency website. Therefore, when evaluating the efficiency of emergency website informa-

tion utilization, we should start with two aspects. The first aspect is to evaluate the information displayed on the emergency website. The other is to evaluate the attributes of the information carrier, that is, the emergency website itself. The interpretation from the user level is the user's experience when interacting with the website. Therefore, this study selects two variables of website information quality (IQ) and website interactive experience (IE) as the external variables of the theoretical model in this research environment. At the same time, this article will evaluate the quality of emergency website information from five aspects: understandability, reliability, timeliness, accuracy, and completeness and evaluate the user interaction experience of emergency websites from the aspects of website design and usability.

Drawing on the existing literature and the mature TAM theoretical model and combined with the research background of emergency websites, this paper sets the external variables as website information quality and website interactive experience, and determines seven indicator variables that affect the use of disaster information by emergency website users, and proposes A theoretical model of emergency website information utilization rate based on TAM model. This theoretical model includes six potential variables: information quality, interactive experience, perceived ease of use, perceived usefulness, attitude towards use, behavioral intention, utilization efficiency. The model is shown in Figure 1.

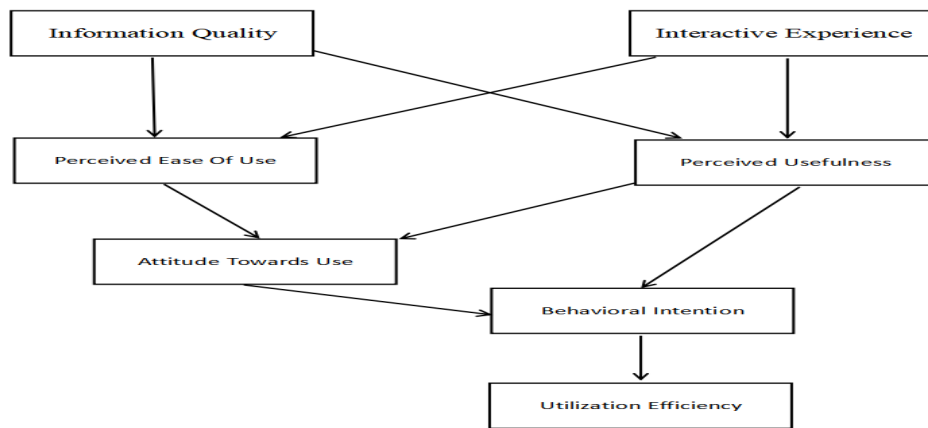


Figure 1. Emergency website information utilization impact model diagram

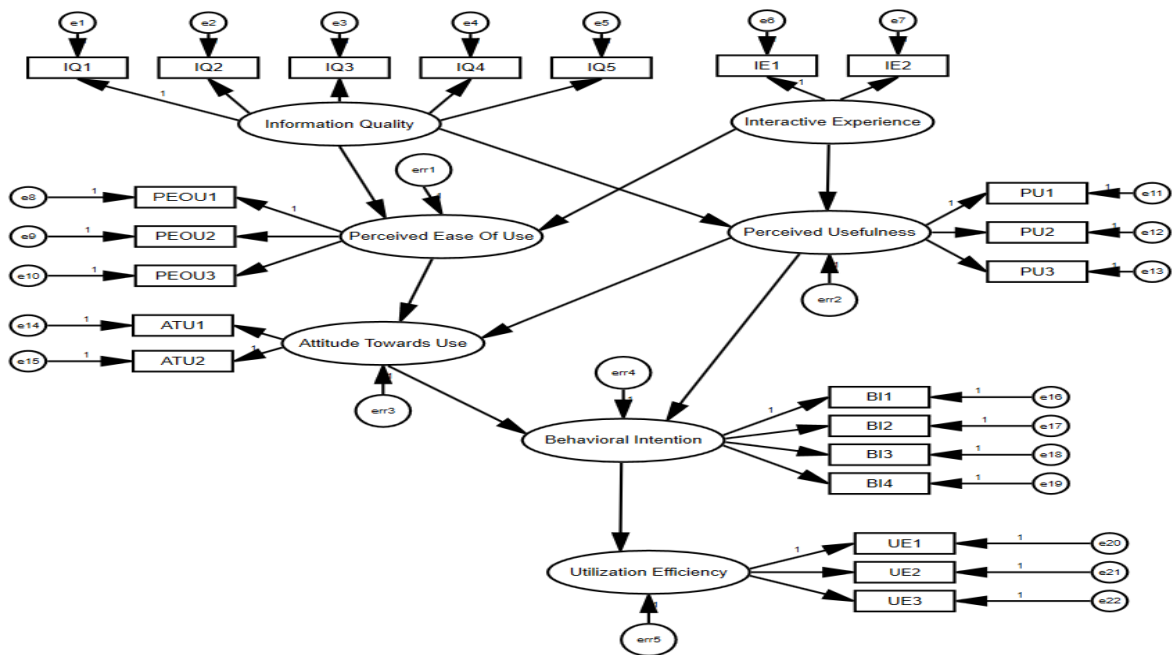


Figure 2. The conceptual model of emergency website information utilization rate

As a socio-economic statistical analysis technique that explores the relationship between multiple latent variables, latent variables and observed variables, structural equation models have been widely used in sociology, statistics, management science and other disciplines (Deng qingjing, 2016). This article mainly uses the observational

variables and latent variables in the structural equation model to describe the causal relationship between various factors. The conceptual model of emergency website information utilization rate is shown in Figure 2. In this article, it is assumed that all relationships between variables are positive correlations. This article mainly uses the question-

naire survey method to collect data and verify the hypothesis.

Data Collection And Inspection

Data Collection

As the platform with the most timeliness and widest coverage for carrying out emergency management work, emergency websites have gradually become a normal tool for providing emergency services. Providing emergency services through emergency websites can not only enable the public to understand emergency knowledge, improve emergency awareness, and prevent crisis events, but also make the people more calm and rational in the face of crises, which is of great significance for protecting public lives and property. Table 1 lists the main overviews of the four emergency website databases.

This article mainly distributes the paper questionnaires on the spot and combines the online questionnaire survey platform (Questionnaire Star) to distribute the questionnaires. The subjects of the survey are mainly Emergency workers of government or public organizations and emergency researcher in universities and research institutes who have frequently used the above four emergency website databases to browse disaster information. In order to ensure the reliability and validity of the questionnaire, it is based on literature research and reference to the mature scales of domestic and foreign scholars, that this article combines the characteristics of emergency websites to make certain amendments to the questionnaire. After the initial questionnaire is formed, this article first conducts a pre-investigation on 25 survey respondents who have browsing experience on 4 emergency

websites to determine whether the questionnaire's item settings are reasonable and effective. After the prediction is completed, this article makes appropriate adjustments to individual items based on the interview results of the investigator, and finally forms the final scale. The main part of the questionnaire mainly includes 22 items in seven sections. The seven plates correspond to the seven latent variables in the model, and the 22 item items are the observed variables corresponding to the design of the seven latent variables. The questionnaire was set up with the Likert7-level scale. Respondents were asked to rate the recognition of relevant descriptive sentences based on their own cognitive experience and actual experience. Among them, 1 point corresponds to very disagree, 2 points to disagree, 3 points to some disagrees, 4 points to general, 5 points to some agree, 6 points to agree, and 7 points to strongly agree.

In the formal questionnaire survey, a total of 130 paper questionnaires were distributed and 122 were recovered. Online survey questionnaire (Questionnaire Star) collected 172 copies. Excluding 27 invalid questionnaires such as incomplete answers, obvious logic errors, continuous multiple questions with no change, and short filling time, the total number of valid questionnaires recovered by the two methods was 267.

Reliability and Validity

In addition to using difficulty, discrimination, etc. as measurement standards, to judge the quality of a questionnaire, the most important measurement standard for judging the quality of a questionnaire should be good reliability and validity.

Table 1. Main Overview Of Emergency Websites Around The World

WEB Name	Mission	Maintenance organizations	URL
Center for Disease control and prevention	CDC works 24/7 to protect America from health, safety and security threats, both foreign and in the U. S.	Center for Dis-ease control and prevention	https://www.cdc.gov/disasters/covid-19/disasters_severe_weather_and_covid-19.html
Federal Emergency Management Agency	FEMA's mission is helping people before, during and after disasters, and our core values and goals help us achieve it.	Federal Emer-gency Man-agement Agency	https://www.fema.gov/disaster/coronavi-rus
GOV. UK(The website for the UK gov-ernment)	Information and services for citizens and businesses; Information on government and policy	The Govern-ment Digital Service (GDS)	https://www.gov.uk/govern-ment/emergency-preparation-reponse-and-recovery
National emergency management agency	The NEMA provides lead-ership in reducing risk, being ready for, responding to and recovering from emer-gencies.	National Crisis Management Centre	https://www.civilde-fence.govt.nz/

(1) Reliability test: The current main-stream reliability testing methods mainly include: retest method, copy correlation method, half method, Cronbach's α coefficient, etc. This article uses SPSS24. 0, and adopts the Cronbach's α coefficient to measure the internal reliability of the scale. The Cronbach alpha coefficient is between 0. 5-0. 7 as credible, 0. 7-0. 9 as quite credible, and above 0. 9 as very credible (Guan Lei, 2020). Reliability analysis of 22 question item data under seven variables in the questionnaire shows that the overall Cronbac's α coefficient value of the questionnaire is as high as 0. 936. This shows that the content of the questionnaire has very good internal consistency and high credibility, which is very suitable for further empirical analysis. Each latent variable is selected for reliability analysis, and the results are shown in Table 2.

It can be seen from Table 2 that the Cronbach's α coefficients of the seven latent variables are all greater than 0. 7. Therefore, it can be seen that the data analysis of the questionnaire can have a high level of reliability and stability, and this data can be used for subsequent research.

(2) Validity test: This article uses SPSS24. 0 to perform KMO and Bartlett's sphere test on the questionnaire. The value of KMO and Bartlett's sphere test are important conditions for judging whether a scale item is suitable for factor analysis. According to the statistical research point of view, if the KMO value is above 0. 9, it means that the validity of the sample data is very good and very suitable for factor analysis; if it is between 0. 7 and 0. 9, it means that the validity of the sample data is good

and suitable for factor analysis; Above 0. 6-0. 7, it means that factor analysis is barely possible; if it is less than 0. 5, it means it is not suitable for factor analysis. Through SPSS24. 0 software analy-

sis, the overall KMO value is very ideal, which is 0. 908, greater than 0. 8. It can be concluded that the validity of this questionnaire is very suitable for verification factor analysis.

Table 2. Cronbach Alpha Coefficient Of Each Latent Variable

Latent variable	Cronbach Alpha	Number of items
IQ	0. 855	5
IE	0. 727	2
PEOU	0. 798	3
PU	0. 816	3
ATU	0. 790	2
BI	0. 810	4
UE	0. 772	3

Model Modification and Verification

Using AMOS21. 0 software, the text imports the questionnaire survey data that have passed the reliability and validity test in the previous article one by one into the constructed measurement model to perform confirmatory factor analysis on the model and calculate the estimated value. This article uses the "maximum likelihood estimation" in confirmatory factor analysis to estimate the parameters. Through the estimated value obtained, the model is revised several times, and finally the revised model diagram that has passed the data verification is obtained in this paper. The revised model is shown in Figure 3.

Model Fit Test

The fitness index can evaluate whether the hypothetical path analysis model diagram and the questionnaire data are compatible with each other. The fitness index includes three categories, absolute fitness index (GFI, RMR, RMSEA), value-added fitness index (NFI, TLI, CFI,), and parsimonious fitness index (PGFI, CMIN/DF). The model fitting index mainly refers to the suggestions of DOLL (1994).

As shown in Table 4, the model's adaptation degree is better except for GFI and PGFI which are slightly lower than the standard values. It can be seen that the model in this paper has a good fit and is suitable for studying the information utilization rate of emergency website.

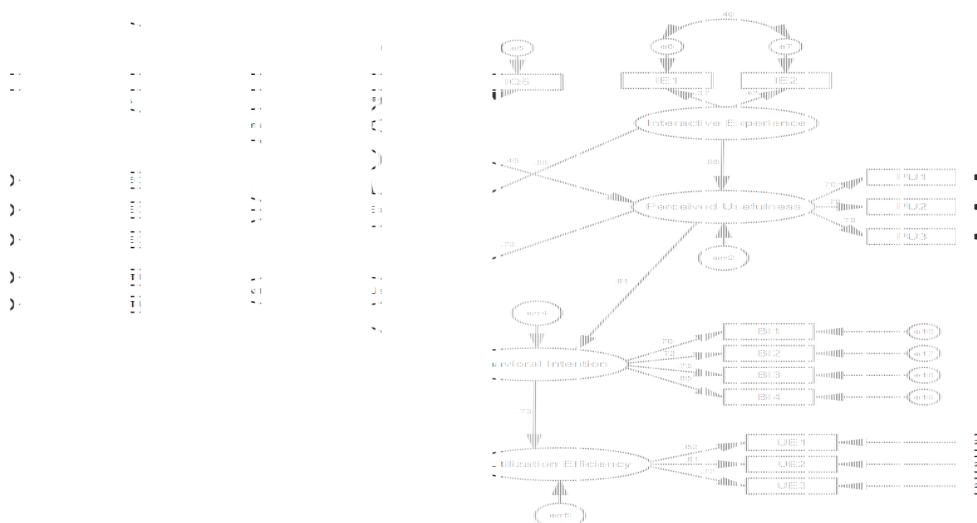


Figure 3. Model Diagram Of The Influence Path Of Information Utilization Rate Satisfaction Degree Of Emergency Website

Table 3. Evaluation Results Of Model Fit

Fitness Index	GFI	RMR	RMS EA	NFI	TLI	CFI	PGFI	CMI N/DF
Judgement Standard	> 0.9	< 0.05	< 0.05	> 0.9	> 0.9	> 0.9	> 0.5	< 3
Measurements	0.864	0.04	0.011	0.959	0.902	0.901	0.601	2.491
Meets The Standard Or Not	NO	YES	YES	YES	YES	YES	NO	YES

Table 4. Standardized Regression Coefficient Estimation Significance Test Results

Path	Estimate	P	Result
PU <--- IQ	0.45	***	Supported
PEOU <--- IE	0.88	***	Supported
PU <--- IE	0.86	***	Supported
PEOU <--- IQ	0.26	***	Supported
ATU <--- PU	0.72	***	Supported
ATU <--- PEOU	0.40	0.012	Supported
BI <--- ATU	0.60	0.042	Supported
BI <--- PU	0.81	***	Supported
UE <--- BI	0.73	***	Supported

Significant at P*** = < 0.001

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Model Significance Test

The path coefficient mainly reflects the degree of causality and correlation between variables in the hypothetical theoretical model. If the path coefficient is positive, it indicates that the influence between the factors is positive. On the contrary, if the path coefficient is negative, it indicates that the influence between the factors is reverse. The absolute value of the path coefficient reflects the strength of the influence.

From the data in Table 4, it can be shown that the estimated path coefficients between all latent variables and their corresponding observed variables have reached a significant level, indicating that the relationship between them is supported by the questionnaire data. In the test of the estimated value of the path coefficients between the latent variables, except the significance probability values of the two path coefficients "perceived ease of use's Influence on attitude towards use and attitude towards use's Influence on behavioral intention" were 0.012 and 0.042 respectively, which are significant at the level of 0.05. All the other paths were significant at the 0.001 level. This shows that all path coefficient estimates have passed the test, and the path relationship between latent variables can be supported by the data.

Results

Using the mature structural equation model, this research adds external variables to the original TAM model for model construction, modification and empirical testing. Finally, a relatively complete model of emergency website information utilization rate is obtained, which provides a certain reference result for emergency website information management.

It can be seen from the model's hypothesis verification results that all path hypotheses are supported. The results of the path surface, the information quality and interactive experience have a direct impact on perceived usefulness and perceived ease of use; Perceived ease of use and perceived usefulness have a direct impact on attitude towards use; Perceived usefulness and attitude towards use have a direct impact on behavioral intention; Behavioral intention directly affects utilization efficiency.

From the analysis of external variables, it can be seen that information quality has a direct impact on perceived ease of use and perceived usefulness, and then has an indirect impact on attitude towards use and behavior intention, and ultimately affects the utilization efficiency of website information. That is to say, the better the information quality of website, the higher the utilization efficiency of website information. The interactive experience of the website has a direct impact on the perceived ease of use and perceived usefulness, which in turn has an indirect impact on attitude towards use and behavioral intention, and ultimately affects the utilization efficiency of website information. That is to say, the better the interactive experience of the website, the higher the utilization efficiency of website information.

Conclusion

Through the above analysis of the results of the conceptual model, the following conclusions can be obtained from two aspects.

The influence of website quality on utilization efficiency. Through the hypothesis verification results of the model and the corresponding coefficients of the model in this paper, the following analysis results can be obtained in this paper.

The easier to understand the information published by the emergency website, the higher the efficiency of information utilization. The audience of website information is ordinary people. Therefore, in the actual website information release, editors should stand on the audience's point of view to make effective wording, and narrow the distance between the website information and the audience in a more comprehensible way.

The more reliable the information published by the emergency website, the higher the efficiency of information utilization. Reliable website information is not only important for experts and researchers to deal with disasters, but also the basis for ordinary people to form correct opinions and take reasonable actions.

The more timely the emergency website updates the information, the higher the efficiency of information utilization. In the face of sudden disaster events, real-time data of disaster information is of great significance to users. Governments and public institutions use real-time data for interpretation and other activities, and people can use data to carry out self-protection work.

The more accurate the information released by the emergency website, the higher the efficiency of information utilization. Accuracy means that the content and data of all information in the website can withstand verification. Accurate disaster information can help the masses to correctly understand the situation of the disaster. The accuracy of information is the basis of the credibility of the website.

The more complete the information obtained from the emergency website, the higher the efficiency of information utilization. The integrity of website information can affect users' satisfaction with obtaining information. The higher the user's satisfaction, the greater the user's stickiness, and the greater the probability of continuing to use the site's information in the future.

The impact of interactive experience on utilization efficiency. Through the above analysis of the results of the conceptual model, the following conclusions can be obtained from two aspects.

The more the interface aesthetics of the emergency website matches my psychological expectations, the higher the efficiency of information utilization. When users visit a website, they will make a first impression of the website based on what they see. The user's judgment on the website's business and professional capabilities is produced in just a few seconds. The aesthetics of the web interface can have a positive impact on the user's first impression of the website. A website with a beautiful interface can help the website retain visitors.

The more usable the information in the emergency website, the higher the

efficiency of information utilization. Usability is an important quality indicator of interactive IT products/ systems/ websites. It refers to the degree to which the website is effective, stable, efficient and satisfactory for users, that is, whether users can use the website to match their needs, What is the efficiency, what is the subjective feeling? A website with strong usability can gain more users' favor. As an important quality indicator of interactive IT products/ systems/ websites, usability refers to the degree to which a website is effective, stable, efficient and satisfactory to users, that is, whether users can use the website to match their needs, how efficient it is, and how subjective they feel. A website with strong usability can gain more users' favor.

Suggestions

Based on the above two conclusions, we put forward two targeted recommendations to improve the utilization rate of emergency website information.

To improve the information release quality of emergency website.

The disaster is related to everyone, and its particularity leads to the public's urgent demand for information. Emergency website managers can improve the information release quality from five aspects: ease of understanding, reliability, timeliness, accuracy, and completeness.

The main audience group of website information belongs to the general public, so the audience's understanding and cognition of the information needs to be considered in the actual website disaster information release. The information release of emergency website mainly conveys information such as the

status quo of the disaster situation, response measures, and real-time dynamics to the audience, which has a top-down characteristic. In the process of information release, website publishers need to edit information from the perspective of the audience, and should consider the audience's understanding of professional vocabulary. For example, when releasing COVID-19 information, some medical professional vocabulary may be involved. In this case, in order to improve the audience's understanding of the information, emergency websites should use more friendly language expressions, such as dubbing, music, graphics, or video to interpret them in an all-round way.

The effective dissemination and use of epidemic information must depend on the trust of users, and the degree of trust depends on the reliability, accuracy, and completeness of the website information. Therefore, website information publishers should ensure the reliability, accuracy, and completeness of disaster information release. Obtaining disaster information is the first step for the public to understand the disaster situation. Reliable, accurate, and complete information helps the public to form correct views and take reasonable actions in the face of a disaster. For example, information such as the number of people diagnosed, the efficacy of drugs, and the status of medical supplies during COVID-19 is not only important to experts and governments in fighting the epidemic, but also the basis for ordinary people to form correct opinions and take reasonable actions.

The timeliness of website information release is the soul of emergency websites, especially complex and changeable disaster information. If you

want to attract users for a long time, you must finally rely on timely updates of website content. The timely update of website information can allow users to understand the real-time development of the disaster situation, and at the same time help the website establish a good image and increase the probability of users' return visits. The emergency websites of party and government agencies control the source channels and publishing rights of authoritative information. Therefore, in the face of emergencies, emergency websites should enhance the timeliness of information release and strive to release information as soon as possible under the premise of ensuring truthfulness and accuracy. The first release of authoritative websites can add psychological certainty to the people, otherwise it will easily cause panic among the people and encourage the occurrence of rumors.

To improve the interactive experience of emergency websites.

When users visit a website, they will make a first impression of the website based on what they see. A website with a beautiful interface can help the website retain visitors. If the web interface looks unattractive, then the user may have a negative impact on the information content of the website, or even close the page without browsing other content on the web. In this way, no matter how good the information content of the website is, it is of no use. Therefore, emergency website maintainers should position the overall style and characteristics of the website, and reasonably plan the organizational structure of the website. Only from the perspective of "user-centered" can website maintainers be able to retain users and make the website alive.

When planning and designing a

website, it is also necessary to fully consider the usability of the website, such as link stability, searchability, response speed, and other factors that affect the user's browsing experience. A website with unstable links, slow response speed, and unclear navigation may cause users to lose patience, and then close the page, then its information content will lose its corresponding meaning. Emergency website maintainers should focus on creating a clear website structure and using mild visual guidance to help users find the information of concern smoothly. Website response speed is also the fatal point that affects user interaction experience. Website management and maintainers can improve the response speed of the website by upgrading the website server, standardizing the application of website pictures, optimizing website code, and so on. At the same time, the user group of the mobile Internet is getting larger and larger, and more and more people like to search and find information directly with their mobile phones. Emergency website maintainers should consider the needs of mobile users and capture mobile users to improve the information utilization rate of website.

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