

# NII Today

## Special feature

### Information and Human Society The New Relationship Between Society and Media

What is the new relationship between society and media?

How is social reality formed between false rumors and truth?

Reduce difficulty in understanding data  
by ingenious presentations of data

CMS originating from NII supports information  
sharing in emergency situations



# Information and Human Society

## The New Relationship Between Society and Media

### NII Interview

## What is the new relationship between society and media?

### Reality that people could not share

**Takahashi** Is there anything you have discovered anew after the Great East Japan Earthquake?

**Kobayashi** Conventionally in Japan, reality in society was shared based on information supplied by mass media. Today, however, numerous alternative forms of media exist, enabling small groups to communicate a great deal. A nuclear power plant accident also occurred. Some people believed that living in Tokyo posed no danger while others saw danger and the need to immediately evacuate, and some actually did so. We couldn't adequately share a belief that Tokyo was safe, even though it seemed quite likely that it was. In other words, a situation has for the first time emerged that makes sharing of reality in our society difficult.

**Takahashi** Could this be because of the essential nature of radioactive harm?

**Kobayashi** Yes, that is a factor, but the underlying issue is the change in media environment. In the United States, viewers have numerous channels available to them, and many of TV, radio, and newspapers are all partisan in nature. There is the so-called "echo chamber" situation, wherein people with extreme views may enclose themselves in a media environment in which they can only hear echoes of their own voices. When this takes place, people lose the opportunity to change their attitudes. Those who are interested in entertainment may choose

to only view entertainment programs. They will gain no knowledge of politics, and the likelihood that they will vote declines. The ratio of people with extreme views rises among those who vote, and more and more candidates come to address the extreme points of arguments because they will get more votes by getting these people's attention. Consequently, legislators are not able to make proper compromises at the congressional level. These sorts of stories have been observed frequently in recent research. Such a situation has not arrived in Japan yet, but mass media that offer common topics of conversation for everyone are gradually declining.

**Takahashi** I totally agree with you. What I find in daily lives is the generational difference. The younger generations almost never read newspapers anymore.

**Kobayashi** But still, I think the roles required of mass media will grow increasingly important, though their business models may change. Japanese people watch a lot of TV – three hours or more each day on average. My data are rather old, but Japanese people are more strongly attached to mass media than people in other countries. (Figure)

### Unexpected consequences of convenient devices

**Takahashi** What made you start researching such a topic?

**Kobayashi** I have researched people's voting behavior, and been interested in how people process information and make their decisions, from a cognitive psychology standpoint. This is what made me interested in the media.

**Takahashi** Which research topics brought about results with the greatest impact?

**Kobayashi** Well, one of my studies revealed that heavy users of cell phone e-mail showed higher probability of having very similar friends, and many people have told me this is interesting. I analyzed it more deeply, and it showed these people are lower in social tolerance toward those who think differently from them. I replicated this finding in a different way and found similar phenomena.

**Takahashi** What do you mean specifically by "a different way"?

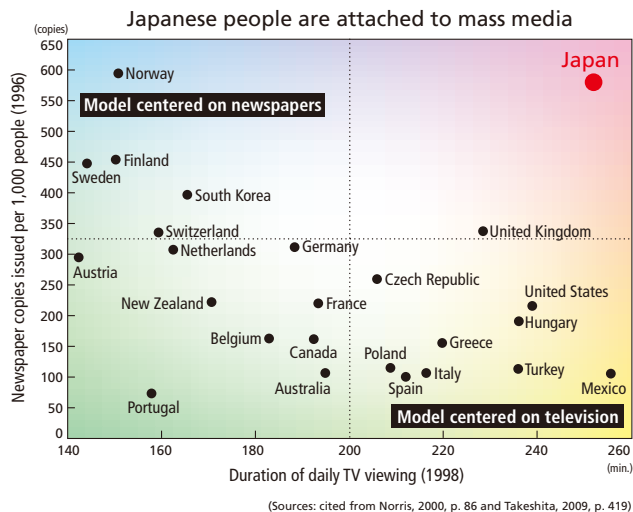
**Kobayashi** There is a concept called general trust, which can be measured from responses to the item, "Most people are trust-



**Tetsuro  
Kobayashi**

Assistant Professor, Information  
and Society Research Division, NII

The Great East Japan Earthquake exposed the dramatic changes that Japanese media environment underwent. Changes in media environment directly bring about changes in society. However, although the prosperity of new media is visible, its effects on human society may not be readily evident. We conducted interviews with social scientists examining this point.



worthy. (Agree/Disagree)" This is low among the Japanese compared to Americans. It may sound strange, but the Japanese people basically lack trust in other people.

**Takahashi** We only trust our friends.

**Kobayashi** Right. This is a research theme studied by the team led by Professor Toshio Yamagishi of Hokkaido University. In Japan, people cooperate with each other because they all know it is detrimental to them if they betray their friends, which typically would result in ostracism. Meanwhile, they have less trust in strangers. Cooperative behavior among Japanese people results from the shared prospect that they will be sanctioned if they betray their friends, in a network of mutual surveillance. It's not that their mindset is collectivistic, but the social systems have been built that way.

In the replication I made, the same people were asked what sort of people came to mind as "most people" right after they answered general trust scales. Theoretically speaking, it would be more desirable if the scope were expanded to encompass all Japanese people or all of mankind, but it differs from person to person; and the frequency of the use of cell phone e-mail correlates with the dispersion. According to data mainly on teenagers, heavy users of cell phone e-mail showed a narrower scope when considering "most people," which indicates that their social perspective has become narrower.

**Takahashi** We tend to think new information devices broaden our horizons, but this is contrary to what actually happens.

**Kobayashi** That's right. If we look at the measurements as is, we find they indicate a higher level of trust with cell phone e-mail users. This is because the scope only encompasses people close to them. But there is an error in these measurements, and a more significant factor is that the scope of those considered "most people" is narrower. Basically, convenient technologies survive but there is uncertainty on whether all convenient technologies are desirable at societal level or compatible with

democratic systems.

**Takahashi** Dr. Kobayashi, it seems that you hope that democracy functions properly, and you are concerned about some of the new technologies when viewed from that standpoint.

**Kobayashi** Exactly. At the root of this is normative theories. I have conducted empirical studies based on these theories on how communication and decisions should be made in a democratic society. Only a few people with NII specialize in social sciences, but I'm very fortunate to work together with information technology researchers.

**Takahashi** What would you like to pursue in the future?

**Kobayashi** Social scientists focus on properly explaining phenomena and revealing hidden causalities, but I hope to intervene more into reality, even though some people say this is too much.

**Takahashi** Political scientists have long argued about whether it is good to intervene in politics.

**Kobayashi** I'm aware of that. Social scientists in Japan have almost avoided "social engineering" ways of researches which make them more deeply intervene in the real world. They even believe it is desirable to stay away from it. But I believe "engineeristic" social science that only seeks to be realistically useful for people and society can also be pursued.

### Comment from the Interviewer

It is embarrassing to admit it, but I was not aware there are social science researchers with NII. However, the word "informatics," if taken literally, naturally involves research in various areas of both the humanities and science. It even seems that a mission of research institutes like NII is to conduct interdisciplinary studies that transcend the boundaries usually found in universities. The enthusiasm of Dr. Kobayashi, who hopes to break out of the shell and proactively commit himself to society, shows a great deal of promise.

### Mariko Takahashi

Senior Staff Writer  
Asahi Shimbun



## How is social reality formed between false rumors and truth?

Immediately after the Great East Japan Earthquake struck on March 11, Social Networking Sites (SNS) such as Twitter played extremely important roles in exchange of information regarding the status of damage and personal safety. False rumors disseminated through SNS, on the other hand, became a serious social issue. What should we select from the piles of information and what should we believe when making decisions in times of emergency? This article probes into how we should evaluate the credibility of information, from interdisciplinary viewpoints of social psychology and informatics.

### Rumors are generated out of feelings of anxiety and ambiguous information

**Kobayashi** Many rumors circulated right after the earthquake, including talk about the fire at the petroleum complex in Ichihara, Chiba Prefecture. You may already know this, but the rumor was triggered on Twitter and spread like a chain e-mail. With the nuclear power plant accident, many people were forced to make difficult decisions while numerous items of news circulated. What warrants attention here is that many held extreme views, and many refused to believe the mainstream information. Some even moved abruptly to the Kansai area, saying they could not believe what the newspapers were re-

porting. We apparently witnessed the difficulty in sharing of social reality in emergency conditions.

Therefore, today we want to discuss, in terms of the credibility of information and the earthquake, where social psychology and informatics can work together. First, could you each tell us the focus of your research?

**Takenaka** I have been conducting research on the topic of rumors. So far, I have been studying rumors under normal situations. I surveyed what sort of rumors prompt people to talk about them with others, and under what sort of situations, or for what purposes, or with what personality types do rumors to spread.

**Mori** My research is on how to handle languages with computers. I think many

people today use information on the Internet to help them make decisions. Each person is responsible for which information he or she chooses from among the great quantities out there. In reality, many people have judged based on what the search engines returned at the top. Some of this information may, however, be low in credibility. Therefore, I have conducted research for supporting people gathering information on the Internet.

**Kobayashi** Let me start with Dr. Takenaka about the rumors you research. Could you give us some examples?

**Takenaka** At University of Tsukuba where I used to work, numerous rumors would be spread by word of mouth. I continued collecting data from the freshman students each year, and found

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Professor, Division of Social Environment and Information Research, Graduate School of Environment and Information Sciences, Yokohama National University

### Tetsuro Kobayashi

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### Ippei Takenaka

Lecturer, Department of Early Childhood Education, Okayama College

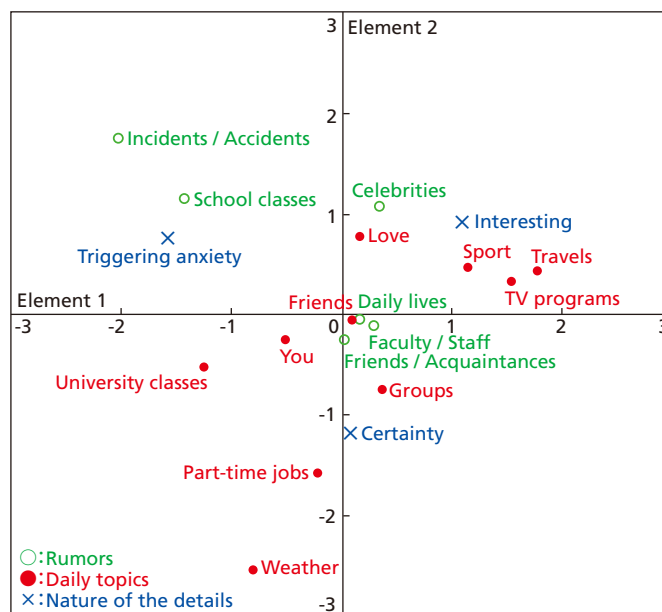


### Fig.1 Relation between Rumors and Other Topics

Rumors concerning incidents and accidents create anxiety, and in many cases the information is ambiguous.

(The quantification method III category scores based on the cross-table and the averages of sample scores are indicated next to each other.)

(Source: Ippei Takenaka and Yutaka Matsui [2007]), "Classifying rumors within the everyday conversations of university students: From the perspective of their content attributes," *Tsukuba Psychological Research*, no. 34, pp. 55-64)



rumors such as the one about a mysterious secret underground base on the site of the university, and an underground path leading to the Imperial Palace, and that the underground path was used for constructing tracks for the Tsukuba Express trains. [Laughter] There are in fact underground public utility ducts, but these rumors are way out there, like urban legends. Another frequently heard rumor is that University of Tsukuba ranks second in the country in the number of student suicides. Incidentally, Hiroshima University ranks first. But when I conducted surveys at Hiroshima University, Tsukuba ranked first and Hiroshima was second. [Laughter] Even though the suicide ratio was a bit high for some time when the university was established, the figures have been close to the national average. Neither university has a high suicide rate.

An interesting point is that variations of rumors change each year. Rumors continue being spread while the contents gradually change, even though the topic remains the same. A characteristic of rumors is that an episode is added to or changed. People have a greater tendency to spread rumors when the feeling of anxiety is strong or only ambiguous information is available. (Fig.1)

**Kobayashi** The nuclear power plant accident exactly fit those two circumstances.

**Takenaka** Right. The survey I conducted on university students in Sendai after the earthquake revealed that rumors had spread relating to nuclear power plants. A frequently heard one was that rain is dangerous, and we should not expose ourselves to rainfall. People were very worried but there was no way to find out the truth; so they spread various rumors in order to find consistency with the conditions. This is indicative of their desire to stabilize reality.

**Kobayashi** When people see a bouquet of flowers in a corner of the school building they tend to think someone must have committed suicide, and they say an earthquake will strike when they see wells and onsen (hot springs) being exhausted or find strange clouds in the sky. This happens because the object of their focus changes due to information they have obtained beforehand. They don't feel anything when they see strangely shaped clouds in normal times, but when they feel anxiety they make up prototype stories to try to stabilize the reality. Whether or not the story is true is another issue.

**Takenaka** What surprised me in the

survey I conducted after the earthquake is that no one thought the present situation was ambiguous. More people felt the situation was ambiguous with last year's case of the new influenza. Even in the absence of a clear source or trustworthy information, in order to attain psychological balance people try to believe the situation is a part of their normal daily lives and not ambiguous. On the other hand, they find it hard to make judgment and are unable to cope with the situations. They go about things as usual, but there is no base to support their daily lives.

**Mori** The nuclear power plant accident was so huge that the situation must be beyond their judging capabilities.

**Kobayashi** What about rumors concerning the earthquake?

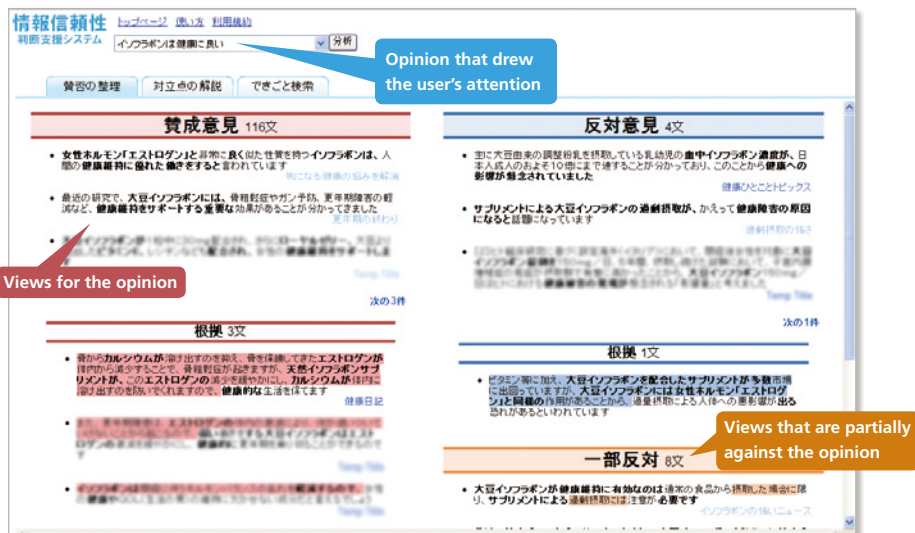
**Takenaka** Each time a huge earthquake strikes, rumors go around about earthquake prediction, and that was the case this time as well. A point to note is that rumors spread in places that were not devastated so badly, where people felt the need to eliminate anxiety.

**Kobayashi** People must have felt motivated to make up the reality because they did not actually experience the disaster.

**Fig.2 Examples of Screens of Support System for Judging Information Credibility (partial) – Statement Map technology**

When users input an opinion they find on the Internet, the system analyzes and organizes a large volume of related textual data found online and displays bases for judgment of the opinion and reference information from multiple viewpoints. Views for and against the opinion and those with the specified conditions can be viewed at a glance, along with documents providing evidence for the views. (Prepared by Tohoku University and Nara Institute of Science and Technology)

URL <http://www.nec.co.jp/press/ja/1101/3101.html>



### A system for listing arguments for and against opinions found on the Internet

**Mori** When we harbor preconceptions as we search the Internet, we will only focus on information that suits our views. Critical thinking\*1 is necessary to prevent this. We need to make judgment after considering opinions that oppose or differ from our own.

**Kobayashi** Yet the volume of data found on the Internet is enormous, and we can't see and verify it all.

**Mori** That is why our group at Yokohama National University has conducted "Research and Development of Information Credibility Verification Technology for Telecommunication Service" jointly with NEC, Tohoku University and the Nara Institute of Science and Technology for three years, consigned by the National Institute of Information and Communications Technology (NICT).

In the project, a system was developed that analyzes and organizes large volumes of Internet-based textual information that relates to an opinion that concerns the user, and displays bases for the judgment regarding the opinion and reference information based on multi-

ple viewpoints. The system enables arguments for and against the opinion and partially opposing views that meet the specified conditions to be viewed at a glance, along with the documents that form the basis. (Fig.2)

The system also explains how to interpret the points in the argument from among important opinions. We can use input of the phrase "Isoflavone is good for the body" as an example. In addition to typical arguments for and against the statement, sentences explaining each of the views and assumptions, as well as points in the argument, are searched and displayed. (Fig.3) Distributions of arguments for and against can also be viewed in chronological order for extracting points where opinions changed and factors behind them.

**Kobayashi** How is the system made up technologically?

**Mori** It utilizes more than 100 million pages of Japanese websites collected by TSUBAKI, an information search engine platform developed by NICT. Important opinions are extracted, and arguments for and against the opinions and their bases are displayed automatically, using Statement Map technology for clarifying corresponding relations among the sentences. The summary report explains how to interpret the argu-

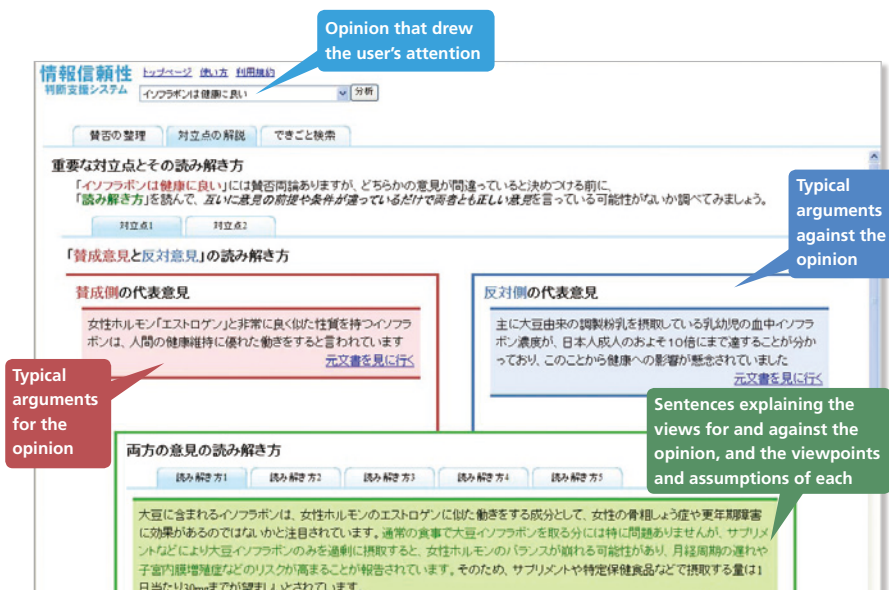
ing points among opinions, words characteristic to views for and against the opinions and neutral views are sought, and sentences containing terms of all three categories are selected.

Though there still remain issues regarding accuracy and processing time, we hope the system will help people in making decisions.

**Kobayashi** This is an extremely useful system. For many people, it is very difficult to independently look for opposing opinions. Once something is settled in our mind, it is hard to alter the reality.

**Takenaka** We tend to think that well-educated people have critical minds and don't spread unfounded rumors. Yet one's level of education has been found to not be correlated with rumors.

**Kobayashi** University professors specialize in different areas, and I am like a novice when it comes to nuclear power plants. But if I made a statement about them, some readers could arbitrarily label it as authoritative. In the case of the Internet, it is extremely difficult to discern the credibility of information. A supportive system like this one gives us a bird's-eye view of the situation, allowing us to realize views we believe are not necessarily mainstream. In many cases, we may find that there are only a few opinions for and against a view, and that



**Fig.3 Examples of Screens of Supportive System for Judging Credibility of Information (partial) – Organization and summarizing technologies**

When there is an important conflict between opinions, the system guides on how to interpret the points in the argument. The system also searches and displays sentences that explain the typical arguments for and against the opinions, the points of view and their respective assumptions, and the points in the argument. (Prepared by Yokohama National University)

most people are neutral.

### Accurate information is demanded real-time at times of disaster

**Kobayashi** Another noteworthy phenomenon at the time of the tsunami was that some people did not evacuate even when a warning was issued. This indicates the difficulty for people to correctly sense fear. The bottleneck is found in normality bias<sup>\*2</sup>. Because of normality bias, when a fire alarm goes off, many people think it was a mistake and they don't leave the building. What do we need to do to overcome this situation?

**Takenaka** Normality bias is tenacious, and it's a difficult issue. When a train was derailed and a fire broke out in a tunnel along the JR Hokkaido line, passengers decided to escape on their own and everyone was safe. On the other hand, people were reluctant to escape in the subway fire accident that took place in South Korea, and many were killed.

**Kobayashi** In some circumstances, a person who is driven by strong anxiety and starts to act is needed.

**Mori** But whether people can make correct judgments depends on the quality and quantity of the given information. In the case of the nuclear power plant

accident, some of the information was hidden for some time. In a case like that, the support system will be useless.

**Takenaka** Osamu Hiroi (1946-2006), who was a researcher on disaster information, said large amounts of correct information need to be announced on a real-time basis in a disaster; otherwise, people interpret the situation incorrectly based on ambiguous information, exposing them to risk.

In this regard, things worked out well with the earthquake. No one panicked or spread malicious rumors to confuse others. No one was suspect of the emergency earthquake updates and information broadcast on TV and radio. This is because the media has broadcast correct information. In contrast, with the nuclear power plant accident, the responsible people hid information and continued saying everything was safe without stating the reasons. This brings about the greatest risk.

**Kobayashi** Maybe they were worried about the public panicking, yet people rarely panic because of the normality bias mentioned earlier.

**Mori** Information needs to be adeptly distributed. Many numerical figures were announced regarding the nuclear power plant accident, but an issue of scientific literacy is involved in how

people understand them. Radiation doses need to be interpreted based on the integrated values according to the elapse of time, but not many people are accustomed to such a process.

**Takenaka** On the other hand, we need to strengthen our resilience against ambiguity, when it's not possible to obtain accurate information. We need to hang on while reserving from making judgment.

**Kobayashi** We should keep several possibilities in mind while retaining a buffer.

**Mori** Informatics is very useful when presenting several possibilities. But again, everything depends on how users ultimately make their judgment.

**Kobayashi** Still, human behavior is never easily changed. Technical support is essential, and more so in times of emergency. We look forward to further developments of the information support tool.

(Written by Madoka Tainaka)

\*1 Critical thinking: A method of thinking that analyzes various types of information by utilizing a critical mind.

\*2 Normality bias: A reaction by humans and other intelligent creatures to psychologically suppress the effects of powerful stimulus from the outside to prevent being upset. This is a measure necessary for protecting normality.

## Reduce difficulty in understanding data by ingenious presentations of data

In recent years, new forms of media such as the Web and Twitter have emerged, and information communicated by politicians, businesspeople, and researchers is considered to have news value on many occasions. Scientific data, on the other hand, has also been disclosed, but their use by the general public is still limited due to difficulty in understanding the meaning of data. Research is underway to surmount this situation so that information is conveyed to the general public in an easy-to-understand way. The outcomes of this research were also utilized to tackle with the Great East Japan Earthquake.

### Conveying scientific data to people in an easy-to-understand way

A project called "Digital Typhoon" <sup>\*1</sup> is going on with the aim of developing a comprehensive collection of all kinds of data related to typhoons. Accumulated data includes image data of meteorological satellites "Himawari" since 1979, typhoon track data since 1951 and Automated Meteorological Data Acquisition System (AMeDAS) data since 1976, and it has developed into one of the world's largest scale database on typhoons. Project leader, Dr. Kitamoto, Associate Professor of Digital Content and Media Sciences Research Division, NII, states: "We hope to make these scientific data, accumulated over a long

period, available not only for scientists, but also widely to the general public. Recently we also study methods for conveying data to people in an easy-to-understand way."

As a solution, Dr. Kitamoto focuses on methods for indicating the meaning of information using a large volume of data as evidence. For example, when the intensity of a typhoon is presented, ranking information such as "the XXth strongest typhoon in history" is presented with numeric values. Ranking information may be easier to interpret even when the meaning of numeric value itself is complicated. "But this is not enough," says Dr. Kitamoto. He has succeeded in attracting people's attention with diverse search and visualization functions that provide a historical context to understand the meaning of data with links to a wide range of related information to enrich the context.

"Digital Typhoon aims to establish an information environment in which users can refer to scientific data anytime they need," says Dr. Kitamoto. "Some people may not be satisfied with a simple form of information, such as the XXth in history. They may want to explore related situations, or broaden their scope of interest after searching, for instance, for the strongest typhoon in history. Providing scientific data as a reference, Digital Typhoon can be used not only as a useful database for inquisitive people, but also as a system for raising new interests"

### Supporting people with scientific data during the aftermath of the earthquake

He proposes an approach to use real-time data for understanding ongoing phenomenon to make evidence-based decisions, and he applies the same approach to other cases than typhoons. Facing with a tragic situation after the Great East Japan Earthquake, Dr. Kitamoto thought about how he can contribute to recovery from the disaster using his experience with Digital Typhoon.

"When radioactive materials were released from Fukushima Daiichi Nuclear Power Plant, many people were searching on the Internet looking for wind direction information," says Kitamoto. "I realized that people wanted easy-to-understand and reliable wind direction information that can be used as evidence for predicting the dispersion of radioactive materials."

He then prepared "Wind Map around Fukushima Daiichi Nuclear Power Plant," displaying wind direction and speed using GPV (meso-scale model)<sup>\*2</sup>, data from a numerical weather prediction model of Japan Meteorological Agency. Arrow directions and colors on Google maps show the wind direction and speed respectively, and the center of the map was set to Fukushima Daiichi NPP. The map was released on March 22. This wind map may be different



**Asanobu Kitamoto**

Associate Professor, Digital Content and Media Sciences Research Division, NII

## Wind Map around Fukushima Daiichi Nuclear Power Plant

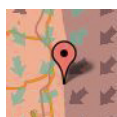
The map, released after the earthquake by Dr. Kitamoto, shows wind direction and speed in the vicinity of Fukushima Daiichi nuclear power plant. The pin indicates the location of the plant. Wind direction is shown by the direction of arrows and wind speed by the color of arrows. Blue shows a gentle wind and higher wind speed is represented by green and red in that order.



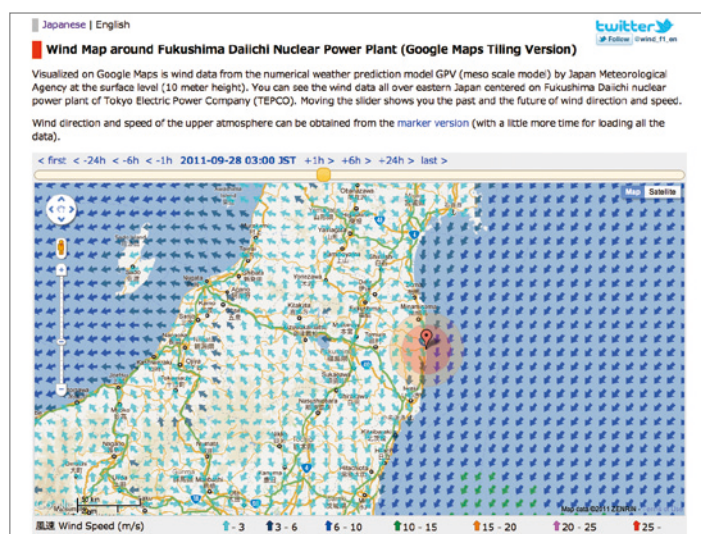
## Twitter account (Tweets in English)



Digital Typhoon  
@DigitalTyphoonE



Wind Map around Fukushima Daiichi Nuclear Power Plant  
@wind\_f1\_en



URL <http://agora.ex.nii.ac.jp/earthquake/201103-eastjapan/weather/gpv/wind/index.html.en>

from real observations because this is based on simulation data, but he explained this problem on his blog post so that users can interpret the data properly based on comparisons. Past and future data can also be shown by moving the slider at the top of the map. Here, all the visualizations are based on data from Japan Meteorological Agency.

“Looking at tweets on Twitter, we can see that many people are using this map for making decisions in their daily lives, such as whether to wear a protective mask or to hang laundry outside,” says Dr. Kitamoto. “Some researchers requested me to provide past data to study the mechanism of hot-spot generation. In fact, there are only a few websites, even today, that compile past meteorological data or make the database of them.”

## Utilizing experiences from the Great East Japan Earthquake for research in the future

The map of wind direction and speed around the Fukushima Daiichi NPP has attracted a great deal of public attention, but this is just one way to use the map.

“This map is a general-purpose tool, rather than a special tool designed for the accident at Fukushima Daiichi. The wind direction and speed map covers the whole area of Japan, so any place can be used as the center, with a pin,” says Dr. Kitamoto. By changing the location of the pin, we can provide the map of wind direction and speed for other nuclear-related facilities. This map is now being extended to include precipitation and other meteorological data.

In addition to the map of wind direction and speed, Dr. Kitamoto is also working on the development of a tool for mapping news articles related to the earthquake. “By mapping news articles on the map, we can perceive the occurrences of events at different places in a more intuitive manner. We wanted to release this tool immediately after the earthquake, but unfortunately we could not make it. But we have been working on archiving news articles for making the long-term records of the earthquake,” says Dr. Kitamoto.

These tools were built rapidly to catch up with the unexpected earthquake, and this experience suggested him several clues for the future development of Digital Typhoon, which he has been

working.

“During the time of disaster, people want to get information related to the projection of the future, in addition to information about the current situation,” says Dr. Kitamoto. “For example, we observed higher needs for information on the forecast of wind direction, and other information about the future. We are planning to summarize our experience during the earthquake and feed it back to Digital Typhoon, with the idea of extending the system for future information.”

The project seems to have progressed from analyzing real-time information to analyze the present situation to a phase of exploring new directions. Will it be a reference to the future using information about the past and present as evidences? Future developments seem to hold a great deal of promise.

(Written by Kaoru Watanabe)

- \*1 Digital Typhoon:  
<http://agora.ex.nii.ac.jp/digital-typhoon/>
- \*2 Numerical prediction model grid point value (GPV; meso-scale model): Numerical prediction is a method for predicting the future atmospheric state, by calculating changes in wind, temperature and other factors via computer. The meso-scale model predicts meteorological phenomena in areas around Japan for up to 33 hours in advance.

## CMS originating from NII supports information sharing in emergency situations

The Great East Japan Earthquake revealed the difficulty in conveying information in devastated areas as a serious issue. It became clear in those conditions that the content management system (CMS)\* offered free of charge by NII for creating websites was utilized differently from in normal times for supporting information-sharing by many people. The roles the CMS is expected to play are expected to expand even further, including the way it is used in emergency situations.

### Imagining what is needed now

Have you ever imagined being unable to contact your family, school or workplace, and not even being aware of the situation you are in? When the Great East Japan Earthquake struck, use of cell phones was disabled even in the Tokyo metropolitan areas that suffered no significant damage. The situation certainly must have brought great anxiety to many since they were unable to obtain information.

“I felt alarmed, thinking that many people must be distressed because they couldn't get information,” recalls Professor Noriko Arai of the Information and

Society Research Division of NII about when the earthquake struck. Professor Arai has developed a CMS for creating websites, and supported numerous people communicating information. She has offered Researchmap for researchers and NetCommons for schools. Professor Arai says she started with what she could, even though she was not sure of what kind of informative support was needed.

The earthquake that struck on March 11, 2011 caused web servers of many universities and research institutes to fail, disabling access of websites. March is the month when academic meetings are usually held, and important notices were found on these sites. Clearly lots of people were concerned about whether upcoming meetings were actually going to be held in the wake of the earthquake.

Professor Arai sent a call to users on the top page of Researchmap to post notices about universities and academic meetings on the bulletin board. In response, about 110 items were posted by the end of May. However, gathering information on Researchmap was inadequate because only those proficient with Researchmap could access it. Therefore, Professor Arai made a setting on Twitter to release a tweet automatically every hour on the contents of the bulletin board in order to disseminate the information. “There is no way to find out how many people actually accessed the information. However, by disseminating it, there were more chan-

ces it would be conveyed to a greater number of people,” she explains.

### Developing a system for precise support

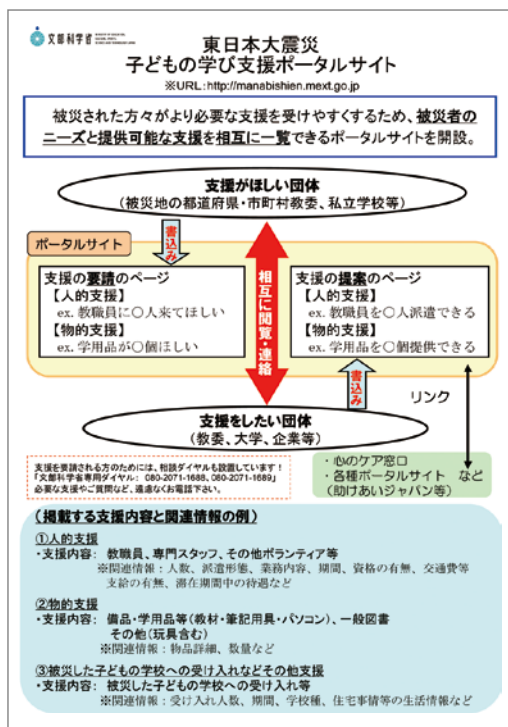
Professor Arai has gotten to know many schools through NetCommons. Among these are schools at areas affected by the Great East Japan Earthquake, and she felt she needed to offer some sort of support, but could not take action because she was unable to clearly confirm the situations. News came in that the Ministry of Education, Culture, Sports, Science and Technology was creating the Web Portal for Supporting Learning by Children Affected by the Great East Japan Earthquake using NetCommons. (Fig.1) On the portal, schools in affected areas can write what sort of support they currently need. The objective is to offer a place to meet people capable of supporting them (matching), thereby realizing precise support.

When a public institution establishes a website, detailed studies are conducted for selecting and deciding the program content. This time, however, support was urgently needed, and studies on content and website creation progressed simultaneously. In such a case, programs need the functionality to respond to different demands and operability that allows them to be immediately put into service. NetCommons precisely meets these requirements. The website was created at a remarkable speed, and



**Noriko Arai**

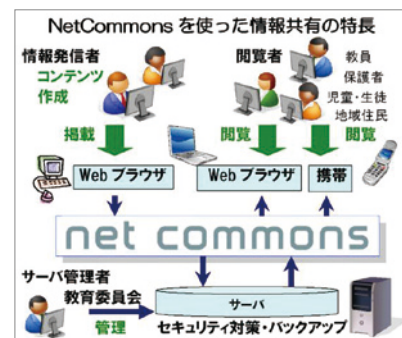
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**Fig.1 Web Portal for Supporting Learning by Children Affected by the Great East Japan Earthquake**

The system enables precise support by matching the needs of those affected with potentially available support. Most of the requests are for desks, chairs and other school items and uniforms for restarting sports club activities. One school indicated it needed yukata (cotton robes) for students, since a summer festival was being planned to cheer people up and ward off the depressing atmosphere. The forms of support needed in affected areas seem to go beyond any one person's imagination.

■ Web Portal for Supporting Learning by Children Affected by the Great East Japan Earthquake  
URL <http://manabishien.mext.go.jp/>



**Fig.2 Why NetCommons was Used Widely after the Great East Japan Earthquake**

NetCommons was used widely due to advantages such as: (1) easy updating of information, enabling timely posting, (2) viewing and writing is possible not only from personal computers but also from cell phones and (3) using the Group Home function, an information-sharing space can be established for certain members.

■ NetCommons  
<http://www.netcommons.org/>

released on April 1. By early July, about 360 cases had been effectively matched.

## Communication tool that schools need

Affected schools, on the other hand, were trying to get back on their feet. School buildings were swept away by the tsunami, and other schools had access paths submerged underwater during high tide due to ground sinkage. All schools were in a state of emergency, and students, parents and faculty needed to keep in touch with each other. Many of the schools that have adopted NetCommons on their website found it greatly useful as a means of communication. (Fig.2)

For example, the Itako First Junior High School in Ibaraki Prefecture confirmed the safety of students' families on the school website. In Fukushima Prefecture, which suffered substantial damage, the educational center of the prefectural government established an information-sharing space for each school on the website. Those associated with schools that evacuated in a hurry without time even for gathering their belongings must have felt reassured when they visited the website of educational center hoping to acquire some information and found the information-sharing spaces for their schools.

## Information platform that can help manage risks

"No means of communication at all are available immediately after a disaster. After awhile when things start moving, whether or not information can be shared affects the speed of recovery and people's sense of security."

In the past, personal communications were made mainly via fixed telephone lines. The good point of this is that they provide direct communication, but telephones are not always answered and sometimes it is not convenient to call everyone. Another inconvenience is people's reluctance to make phone calls early in the morning and late at night. The Internet resolved all these issues. Anyone can send out messages without worrying about the time, enabling situations that by the minute to be immediately communicated to a large number of people. Easy-to-use websites are needed in order to fully take advantage of the benefits of the Internet. CMS's such as Researchmap and NetCommons served that purpose.

Incidentally, Professor Arai says she has always felt that CMS's have the potential to be greatly effective in critical situations. When the new influenza epidemic broke out in Kobe in the winter of 2009, schools that used NetCommons were able to send out notices

on school closing and messages about how students should spend time while the schools are closed, enabling them to maintain smooth communication between the schools and students and families. In view of the example, Professor Arai had started approaching schools, recommending they adopt NetCommons on their websites since it is also effective for crisis management; and then the Great East Japan Earthquake struck.

The examples with Itako First Junior High School and Fukushima Prefecture educational center had a great impact. The Kyoto, Gifu and Hyogo prefectural governments have already begun efforts for introducing NetCommons at all of their schools.

"We can never prevent disasters 100%, no matter how well we are prepared," says Professor Arai. "In view of the situation, information-sharing is important for disaster mitigation at preventing damage from getting worse." Professor Arai believes even further efforts are needed for improving and disseminating CMS's, which can be quite useful for crisis management.

(Written by Akiko Ikeda)

\* CMS: Content management system, used for configuring and managing websites and portals

## In Search of Resilient ICT Systems

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Around 3 pm on March 11, Friday, 2011, I was somewhat dumbfounded in my office, looking at the computers as well as paper documents and books thrown onto the floor. I tried to turn off all the devices I could see to protect them from malfunctions upon a sudden power recovery. I told my students to go home immediately and, especially for foreign students, to contact their families by whatever means they could use. Cell phones were not working, but 3G data connection was alive. Using my smartphone I wrote on Twitter that I was all right. I dug out a laptop PC from among things on the floor and headed home.

In my car caught by the traffic congestion on the way back home, I was just worrying about the possibly messed-up rooms in my apartment house. In front of me stood a heavily damaged apartment house with many concrete walls cracked and some iron wires sticking out. It was unusually quiet in the area. I took a look into the elementary school across the street, and found many people had evacuated there. Some junior high school students were gathering together, in their school uniforms, tightly gripping cell phones like a charm in their hands.

I returned home and waited for the electricity to come back, but it did not. I could use a 3G modem on my laptop, while WiMAX had no reception even in a service area normally. Having more than one means for communication is crucial. The cell phone networks are basically dependable since the infrastructure is well designed and recovered in a higher priority. Due to the power failure, the mail servers in the university could not receive emails for two days. Gmail began complaining about being unable to forward emails to the university.

A few days later, I started hearing many rumors. Some said Twitter was useful, while others said it was useless. Some were happy to receive emails for confirming safety, while others found them a bother. Although the experiences differ from person to person, what we should focus on is the nature of the communication media and how they were used.

Cloud services have drawn attentions from not a few universities since the Great East Japan Earthquake. Indeed remote backup is quite important. But, did the business continuity plan prove effective immediately after the disaster? Without the Internet, we could never access applications or data in need immediately on the affected sites. In fact the Great Earthquake damaged four under-sea cables bound for the United States, and only one was usable. We were very lucky to be able to use Twitter, Google, etc.

If the work environment can be installed on a laptop computer and if it can be brought out, it would be quite useful for business continuity, even with some service degradation. This is indeed a very interesting theme – probing into how we should combine standalone and cloud computing to get optimal results. This topic needs to be analyzed and verified from diverse viewpoints.

I would like to express my deepest gratitude to all those in Japan and abroad who have pitched in to help the devastated areas. At the same time, I would like to think more about disaster mitigation rather than disaster prevention. On the basic premise that a power source can be secured, how should we develop academic information platforms to mitigate damage from potential natural disasters? The key could be found in the academic cloud services “with resilience” for enabling a prompt service recovery.