# Interim evaluation report (draft):
# Interactive Knowledge Process Research Subgroup

## 1. Objectives

The goal of the Interactive Knowledge Process Research Subgroup is to establish a method for realizing, as an implementation of science and technology for society, the interactive knowledge process by extending conversation using innovative information media technologies. We aim at establishing, as the basis for science and technology for society, the interactive knowledge process that society can trust and depend on, and all people can participate in without difficulty. We apply the idea of the interactive knowledge process to risk management for a safe and secure society, a task which various mission groups have undertaken.

## 2. Members

| Name | Affiliations |
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| Toyoaki Nishida | Professor, Graduate School of Information Science and Technology, the University of Tokyo |
| Yukiko Nakano | Researcher, Science and Technology for Society Research System |
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## 3. Target achievements

Studies on the interactive knowledge process consists of modeling, system development, evaluation, and enhancing technologies.

### 3-1. Models

Conversation is the most natural communication medium to people. We will develop a model for designing, implementing, deploying, and evaluating the interactive knowledge process by extending conversational communication.

### 3-2. R&D of the communicative infrastructure

We will take the following three steps toward the goal:

(1) Systematization and evaluation of an existing prototype

We will systematize an existing prototype as a community communication infrastructure and create a nontrivial amount of contents for it, so that we can empirically identify the requirements for the interactive knowledge process as a communication infrastructure of science and technology for society.

(2) R&D and evaluation of the integrated communication infrastructure that supports community knowledge processes

We will design, develop, and evaluate a large-scale prototype of a community communication infrastructure equipped with major functions necessary for risk management.

(3) Construction of an immersive communication environment

The final step is the construction of an immersive communication environment that will allow people to experience the virtual world about the subject. We focus on earthquake disaster, and build a three-dimensional virtual environment for it and have one or more agent appear in the scene who can make conversation with the users, which, as we believe, enables the user to share such experiences through conversations while experiencing the circumstances in a realistic manner.

### 3-3. Development of evaluation methods

We will develop a method for quantitatively evaluating the effect of embedding the interactive knowledge process in the human society.

### 3-4. Research on enhancing technologies for interactive knowledge process

This research will be carried out primarily by part-time researchers in search for an advance technologies that may facilitate an even more effective use of the interactive knowledge process in the human society.

## 4. Status and self-evaluation

### 4-1. Clarification of the concept of the interactive knowledge process

We have defined the interactive knowledge process as a knowledge-creating process based on a story-conversation mutual conversion spiral model. We believe that we have accomplished the first step by clearly establishing the process's background, requirements, basic principles, and component elements. From here on, we will make this first step as the starting point and increase discussions, make modifications, and make the model more detailed so that we can gain a broader consensus on the concept.

### 4-2. Clarification of the role of the interactive knowledge process in science and technology for society

We have reestablished the role and position of the interactive knowledge process in science and technology for society, and assigned it as the basis for enabling the dissemination of the information and knowledge possessed by individuals in society, for circulating that information and knowledge throughout society, and for further developing that information and knowledge. In addition, we were able to present a simple scenario that utilized the interactive knowledge process in seismic disaster prevention. Our future task is to create an even more precise model of the interactive knowledge process in multiple sectors of science and technology for society and to draw up a representative scenario of applying such a model.

### 4-3. Implementation of the interactive knowledge process

As a prototype that includes the basic ideas of the interactive knowledge process, we began designing and developing a full-scale integrated community communication system in FY2002. We have completed about 70% of the system as S-POC (Stream-oriented Public Opinion Channel). With S-POC, users need only to designate the files of their favorite videos and visual images and to enter descriptive sentences, and a TV program-like display featuring a character that explains the content is created automatically. Since S-POC is a Web application, anyone can create TV program-like Web contents anytime and release it to the general public. This is a revolutionary media conversion technology that reduces the cost of program production, which ordinarily requires a tremendous amount of labor and time. It also enhances S-POC's usage value.

To further upgrade the functions of S-POC to be the core of our interactive knowledge process, we have developed a policy discussion support system and a system that automatically produces conversation contents (slides + scenario), using natural language processing technology, that presents various information efficiently, and that supports information space searches. With the cooperation of various research groups, we created conversation contents focusing on seismic disaster prevention, failure knowledge bases, etc. As a result, an image of an interactive knowledge process, which this subgroup targets, became clear. We believe this to be a major step forward.

Moreover, we have gained some prospects on the flow model of information and knowledge in society (which will become the key to designing the method for embedding interactive knowledge process in society), as well as on the R&D of Social Intelligence Quantity (SIQ), a social intelligence evaluation package (for evaluating the effects of the interactive knowledge process as a standard psychological yardstick). These are highly significant in terms of pushing our project ahead.

**4-4. Clarification of the interactive knowledge process's demonstration plan**

The biggest barrier concerning the interactive knowledge process is the difficulty of embedding it in society and evaluating it. For the process to take root in society, we need to overcome two obstacles: practical usage and competition. As for practical usage, EgoChat, which is the predecessor to S-POC, is planned to be used as an auxiliary system in university lectures/classes and as a system for making interim evaluations of the science and technology for society research system. We therefore have some prospects for the interactive knowledge process being put to practical use. Regarding competition, the concept of the interactive knowledge process, as things stand now, is unique to this subgroup, and, at the same time, S-POC is a highly original system not seen anywhere else in the world. Therefore, we believe that there is no problem with competition. As for demonstration experiments, the subgroup leader and three subgroup researchers are experienced with conducting joint demonstration experiments with corporations targeting about 450 households. Having such individuals in our subgroup is a tremendous advantage, and we are currently giving consideration to conducting similar experiments with part-time researchers who have different backgrounds. Our future task is to give concrete form to demonstration experiments and to make them a success.

To prepare for these activities, we conducted corroborative analyses last year of information communication activities as a whole, centering on the interactive knowledge process by taking into account both actual statuses of these information

communication activities as well as their needs and seeds. As a result, we learned that a little under 30% of Internet users were “interactive knowledge process-oriented,” that their needs had formed a certain structure, and that the structure of their needs corresponded with the combination of seeds that the interactive knowledge process technology envisions. In other words, “interactive knowledge process-oriented” individuals have substantially higher needs concerning information demand, information dissemination, and other factors. It became clear that “interactive knowledge process-oriented” individuals had an especially strong need for information on social and regional situations/environments such as safety of nuclear power plants and waste incinerators; on disaster prevention and other risk information; on market trends; and for information regarding the regional community, such as volunteer activities and town development. About half of the “interactive knowledge process-oriented” individuals wished to use the interactive knowledge process in conducting “discussions and consultations on interesting themes related to their work.” These individuals are our target users, those who should enjoy the fruit of our research on science and technology for society.

In view of these findings, when conducting demonstration experiments targeting “interactive knowledge process-oriented” individuals who have high information literacy and who frequently use business tools, it is essential that we select themes directly linked to social issues such as those mentioned above, which these individuals are strongly interested in, and that we have them use a system that is as equally usable as the commercial information infrastructures they are accustomed to using on a daily basis. For the former, therefore, we have prepared themes that are highly social in nature and have high actual demand, such as disaster prevention and failure studies. For the latter, we are preparing to offer, on an open and easy-to-use interface, advanced processing of interactive knowledge process technologies by using the Contents Management System, or CMS. We believe that these considerations concerning target users are important to truly realize the idea/principle known as research of science and technology for society.

**4-5. Status of progress related to individual items**

The following shows the status of progress for individual items.

(1) Interactive knowledge process models (status: 50%)

(2) R&D of interactive communication base

(2-1) Technologies that use the existing systems and evaluations thereof (progress rate: 85%)

(2-2) Integrated community communication system, S-POC (progress rate: 70%)

(2-3) Construction of an immersive interactive environment (progress rate: 20%)

(3) A social intelligence evaluation package, SIQ ( progress rate: 30%)

**4-6. Clarification of future research scenarios**

Development of S-POC has passed its peak, and a plan for future R&D has been devised. We are working to produce a prototype by positioning the creation of the immersive interactive environment as the next step in S-POC's advancement. Meanwhile, we have drawn up a research scenario for the fourth and fifth years to develop a dialogue system between experts and society using the S-POC, as well as to develop a social intelligence evaluation package, both of which have not yet passed their peak. Our future task is to create a scenario for the implementation of these systems in society and for conducting demonstration experiments.

In demonstration experiments, we will offer concrete success stories so that we can obtain even more extensive findings as researchers of science and technology for society. Along with this, we will conduct quantitative analyses to gain an even more objective understanding of our research. Since several years ago, we have developed an index called the Social Intelligence Quantity (SIQ) and have conducted a comparative analysis of the method of planning experiments between S-POC and ordinary electronic bulletin boards (the control group). For the present demonstration experiment, we will develop a quantitative analysis method without establishing a control group. We plan to organically integrate these two analytical methods. To do this, we will incorporate, as indices of specific behaviors/activities, the log data of information accesses and system uses, and we will carry out comprehensive analyses that combine normative analysis with descriptive analysis. In so doing, we hope to identify realistic, behavior-based user benefits and needs and to make them available for validating specific outcomes as a research of science and technology for society.