

Ethno-Cognitive Interview for Understanding and Visualizing Realities of Customer's Business from Workers' Viewpoints

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To build effective IT systems that improve a customer's business environment, an IT vendor must accurately understand the customer's business, define specifications in cooperation with the customer, and formulate the specifications that they request. We have developed an interview method that enables us to accurately understand the realities of a customer's business from individual workers' viewpoints. This method called ECOW Interview (Ethno-Cognitive Interview for Work practice understanding) uses original interview worksheets that help us facilitate the interview process and understand individual workers' tasks from several viewpoints such as time, working space, and human relations in 90-minute interviews. By combining this method with one-day observations of workers' offices, we can visualize the realities of a customer's business and select problems to be solved. This process enables us to submit a convincing IT proposal and develop a system with little reworking. In this paper, we introduce the ECOW Interview and its major results. We also describe how ECOW Interview has been used at a financial institution.

1. Introduction

To build an effective IT system that improves a customer's business environment, an IT vendor must accurately understand the customer's business, define specifications in cooperation with the customer, and formulate the specifications that they request. In addition, visualizing the realities of the customer's business and sharing its problems with the customer are a starting point for Fujitsu's theme of Field Innovation.¹⁾

To visualize the realities of a customer's business, it is important to manage data and the workflow. For this purpose, we have conducted data log analyses and hearings to specify the workflow. However, if only approaches such as data-centered analyses and process-centered analyses are taken, it is difficult to understand the workers' awareness of issues (which are invisible from outside), their sense of burden,

and various measures that are not described in the worker's work manual. As a result, there are many cases when a new system does not fully meet the customer's actual requirements.

In keeping with the idea of human centered design,²⁾ to achieve useful system development, we think it is essential to understand the realities of a customer's business from the workers' viewpoint, and we have learnt about our customers' business by conducting field work at workers' offices.³⁾ However, we often found it difficult to observe at these offices because of the customers' office restrictions and difficulties in understanding the customers' complicated and diverse business affairs with only short-term observations. Therefore, to replace the observation or to grasp the big picture of a customer's business before the observation and limit the number of observation points, we thought we needed to learn the

realities of the customer's business through systematic interviews with individual workers. We then developed Ethno-Cognitive Interview (ECOW Interview), which is an interview method for understanding a customer's business that uses knowledge from the humanities and social sciences such as cultural anthropology and cognitive psychology.

In this paper, we introduce ECOW Interview and the major results that can be obtained by using it to understand a customer's business. We also describe how ECOW Interview has been used in an actual business negotiation.

2. Interviews for understanding customer's work practices

In a typical office, the workers make efforts to keep their business on track under the present circumstances, and they often perform actions that deviate from the regular process. To understand the realities of a customer's business, which we call their work practices, it is essential to identify these efforts and the situation on the ground; however, it is not easy to encourage workers to speak freely in interviews.

The main purposes of interviews are as follows:

- 1) To obtain as much information as possible, including the big picture of the interviewee's tasks, within the given time.
- 2) To ask interviewees about the realities of non-routine tasks they perform and their awareness, sense of burden, and motivation to do their tasks.
- 3) To obtain information that is as reliable as possible and encourage workers to speak freely.

To achieve these purposes, we developed ECOW Interview to help us understand the realities of a customer's business. This interview method is based on methods such as the ethnographic interview,⁴⁾ which is used in cultural anthropology, and the cognitive interview,⁵⁾ which was developed for criminal investigations in the

UK.⁶⁾

In an ECOW Interview, the interviewer teams up with a recorder and they use special tools, three major ones of which are:

- 1) Interview worksheets for understanding interviewees' tasks from several viewpoints such as time, working space, and human relations.
- 2) Check sheets for understanding interviewees' tasks to obtain contextual information about the time required for tasks, the persons responsible, and how often the tasks are performed.
- 3) An interview progress chart that we prepare beforehand to plan the order of worksheets, estimate the time required for each sheet, and outline the questions so we can perform the interview process within the allocated time.

By using these tools, we help the workers fill out the interview worksheets and recount events in their daily workflow and the verbal communications they had with their coworkers.

Interview worksheets are tools that encourage interviewees to speak voluntarily and recall their memory, and also help to control the flow of conversation by focusing on topics. To understand the interviewees' tasks, instead of asking specific, detailed questions, we obtain reliable information by asking them to recount events based on viewpoints such as time, working space, and human relations. By using several worksheets and interviewing from multiple viewpoints, we help interviewees remember their experiences and reduce the amount of listening failures so we can grasp the big picture of a worker's task. **Figure 1** shows some example interview worksheets.

The check sheet consists of sample questions for grasping the points we need to clarify in order to understand the interviewee's task based on a work-context model (**Figure 2**), which we create based on Reference 7) and other sources. To clarify the background information (context) about

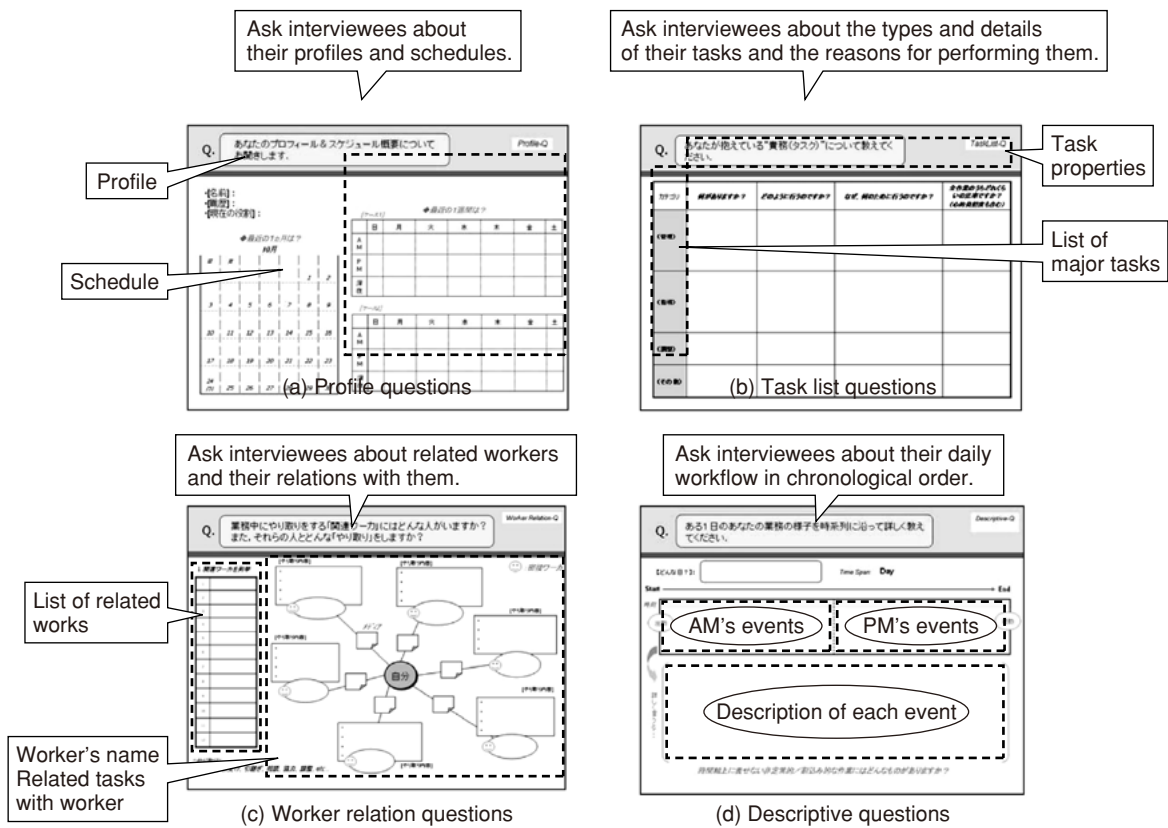


Figure 1
Example of interview worksheets.

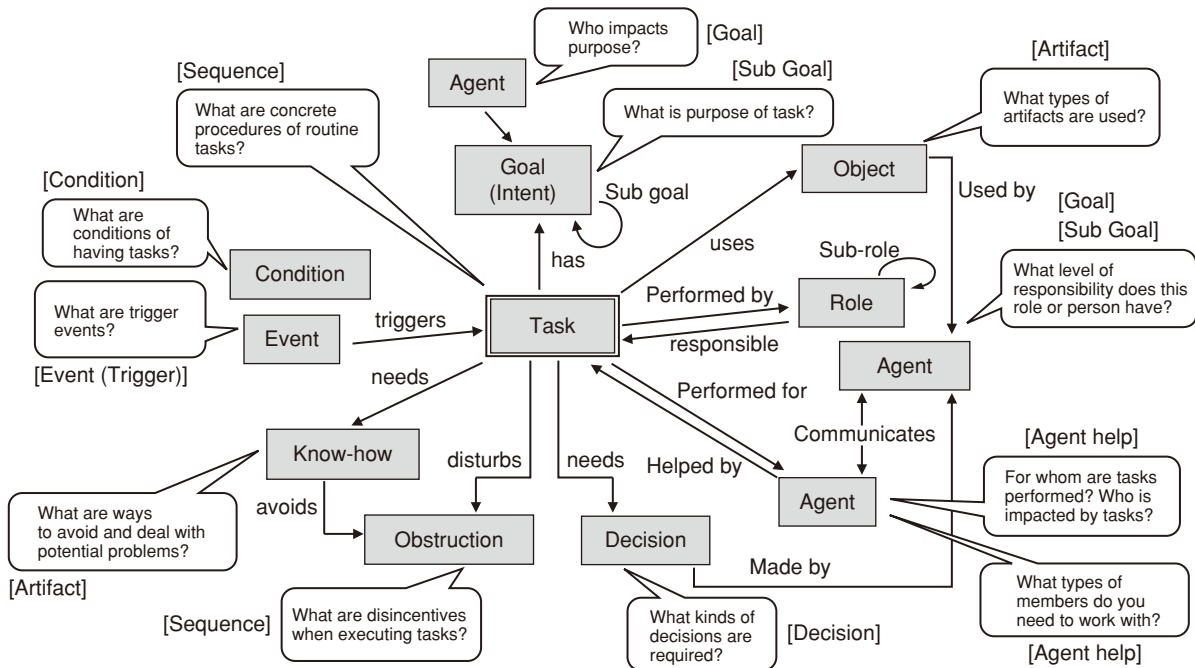


Figure 2
Work-context model.

the workers' tasks, we ask questions from various viewpoints such as "Why are you doing that?" "What will be affected if you don't do that?" and "What are you doing?"

We prepare an interview progress chart in advance by modifying the standard progress chart according to how much time we allow for the interview and the characteristics of the interviewees' tasks. We plan the interview and describe the time allocation, sequence of question worksheets, and the points we should focus on. Although interviews are rarely conducted according to the progress chart, it is important to map out a strategy for an interview in advance.

In addition to these tools, we prepare a booklet about basic interview techniques that we can use such as careful listening and the repetition of interviewee's words.

Figure 3 shows an interview being conducted by an interviewer and a recorder, who also checks the progress chart, asks additional questions, records the interview on an IC recorder, and videos the interview worksheets on the table. Interviews normally take about 90 minutes, and the interviewers sits next to or diagonally from the interviewees so they do not become nervous.

3. Analysis process and its major results

To share the interview results with customers and other persons involved, we convert the interview data into text and use it to create a wide variety of analysis results. In many cases, after the ECOW Interview, we conduct a one-day observation at the interviewee's office to verify what the interviewees have said and obtain additional facts we could not obtain in the interview.

Table 1 shows some examples of major analysis results, and **Figure 4** shows a typical analysis process flowchart. There are two types of secondary results: 1) a visualization of the realities in which the workers' tasks are

expressed in an easy-to-understand way for the persons concerned and 2) a visualization of the findings (or "kizuki" in Japanese), in which we sort and describe the issues that should be improved and devices that should be shared. We share the results that visualize the realities mainly among IT vendors and share the results that visualize the findings with customers.

When we create these results, we strive to include every useful piece of information and conceal the names of the interviewees. We also present them in a manner that the customer's management and workers can understand.

The type of secondary results we create depends on the purpose of the interviews and the time constraints, and we do not always create all of the secondary results that are available.

In addition, in this analysis process, we frequently use the KJ Method,^{(8),(9)} which is used to collect and group similar items from the individual facts we gain, build intergroup mutual ties, and classify from the bottom up instead of organizing the individual facts according to categories prepared beforehand by an analysis team.

4. Example case

In this section, we describe an ECOW Interview we conducted to complete negotiations for a system renewal and the front-end of requirements definition for a branch office at a financial institution.

From many years ago, systems for financial institutions have been developed using 1) industrial engineering (IE) methods to analyze jobs, for example, the number of transactions, processing times, number of times bank clerks leave their seats, and number of seals that are used and 2) spatial analyses focused on the location of items and the flow of human activity. In this example case, in addition to these analyses, we conducted ECOW Interviews and a one-day observation at the financial institution to analyze the workers' invisible human awareness of issues and



Figure 3
ECOW interview scene.

Table 1
Major analysis results.

| | | | |
|-------------------|----------------------------|--|--|
| Primary results | Interview log | We converted interview audio data to text. | |
| | Observation notebook | We made a fair copy of the observation events and organized them. This notebook includes photographs taken in the workers' office and a wide variety of materials used at the time of observation. | |
| Secondary results | Visualization of realities | Organized interview worksheets | We made a fair copy of the interview worksheets filled out by hand to facilitate visualization and complemented them with the interview log and video recordings. |
| | | Task category list | We selected the tasks that each worker accepts and organized them using the KJ Method. |
| | | Log summary by task | We edited and organized the interviewees' comments according to the tasks classified in the task category list. We made major items such as the time, persons who worked together, and task completion from the viewpoint of the check sheets for understanding interviewees' tasks. |
| | Visualization of findings | Findings classified list | We organized selected findings such as problems, devices, and awareness into a list using the KJ Method. We summarized them into six to eight major categories and up to eight minor categories. |
| | | Findings filing list | We added and organized the interview log and observation events for the individual findings that we organized using the above-mentioned findings classified list so they could be used as analysis data. |
| | | Findings sharing sheets | We organized the contents of the findings, analysis data, and direction of reforms for critical findings using one sheet of paper per item. |

motivation.

1) Interview and observation process

We conducted ECOW Interviews on seven workers in three branch offices (1 savings manager and 2 tellers in one branch office and 1 savings manager and 1 teller in the other two branch offices). We then made four one-day observations, including taking videos with a digital camera, at the three branch offices (twice on busy days at all three offices and once on an ordinary day at one of the branch offices).

2) Analysis process

To make a clear distinction between the roles of the worker analyses and job analyses we performed, we conducted an analysis that focused on the workers' invisible awareness, sense of burden, and motivation to do their tasks. We selected about 450 findings from the interview

data, classified them using the KJ Method, and organized them into seven major categories and 45 critical findings. We created a findings filing list to organize "evidence" (interviewee's utterances and observation events) from which we derived findings. We also created a findings sharing sheet (Figure 5) to organize the awareness of problems and the corresponding recommendations about the direction of reforms into major categories.

3) Report to the customer and operational effect

We presented our results in a debriefing session for executives, general managers of each branch office, and directors and section chiefs of the department of clerical work. The presentation included the results of the ECOW Interviews, the one-day observations, and the job and spatial analyses that were also performed.

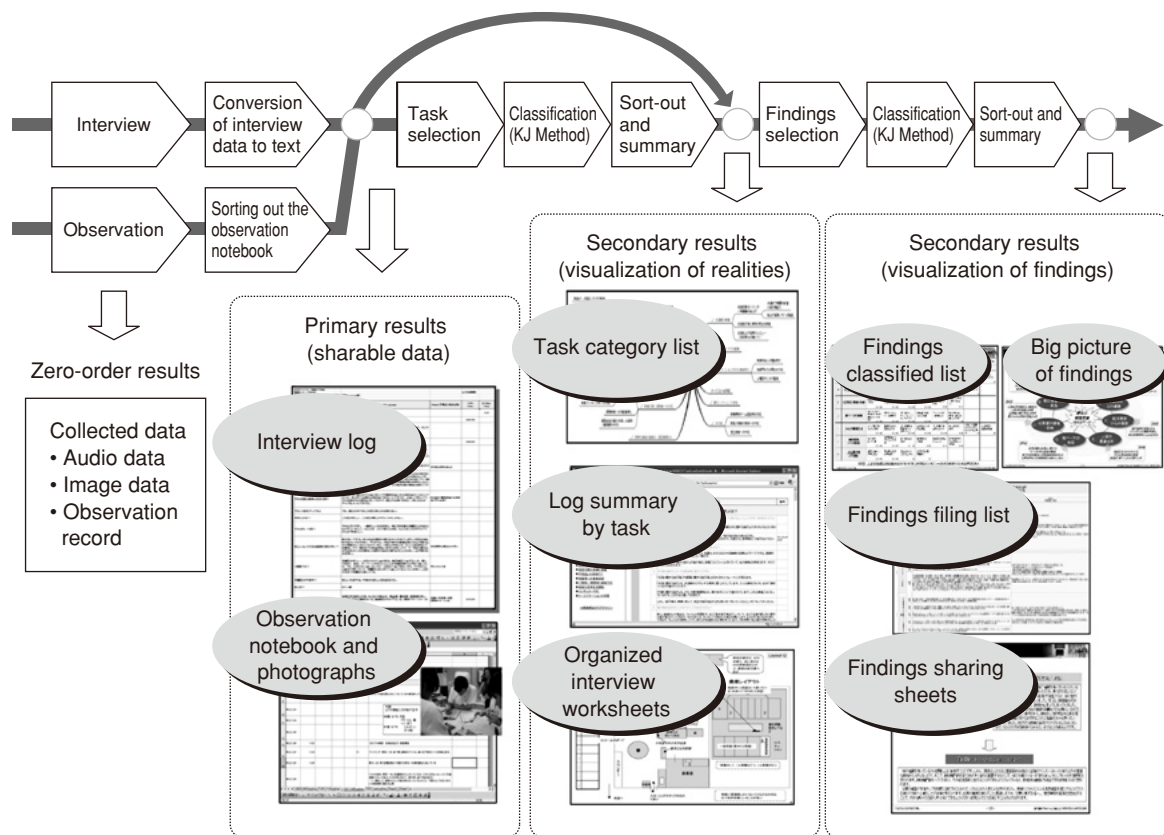


Figure 4
Typical analysis process flowchart.

The results of this method were praised higher than our original expectations, and we succeeded in system development negotiation without lapsing into price competition. Moreover, subsequent internal analyses revealed there was less need to repeat tasks in lower processes than in previous business negotiations of the same scale. We believe this reduction was achieved because 1) we shared the realities and findings of the customer's business at the branch offices and the direction of the solution among the persons involved and 2) because the system development was promoted in synchronization with clerical work improvements made by the customer's departments.

5. Conclusion

In this paper, we introduced ECOW Interview, which is an interview method developed to effectively understand the realities of a customer's business from the workers' viewpoint. This method uses knowledge from areas of the humanities and social sciences such as cultur-

al anthropology and cognitive psychology and special tools such as interview worksheets. A 90-minute ECOW Interview with a worker enables an interviewer to grasp the big picture of the worker's tasks and obtain information about the worker's invisible awareness and the realities of the worker's non-routine tasks. In addition, field work conducted with interviews and one-day observations using this method allow us to visualize the realities of a customer's business and share problems that need to be addressed with the customer, which makes it possible to submit a convincing proposal based on the workers' office realities and define requirements that mostly do not need to be redefined later on.

We have established an education curriculum for this method and conducted educational activities to expand its use.¹⁰⁾ In the future, by accumulating successful cases of using ECOW Interview, we plan to promote the development of procedures and tools so the method becomes more time-efficient and evolves into a high-quality analysis process.

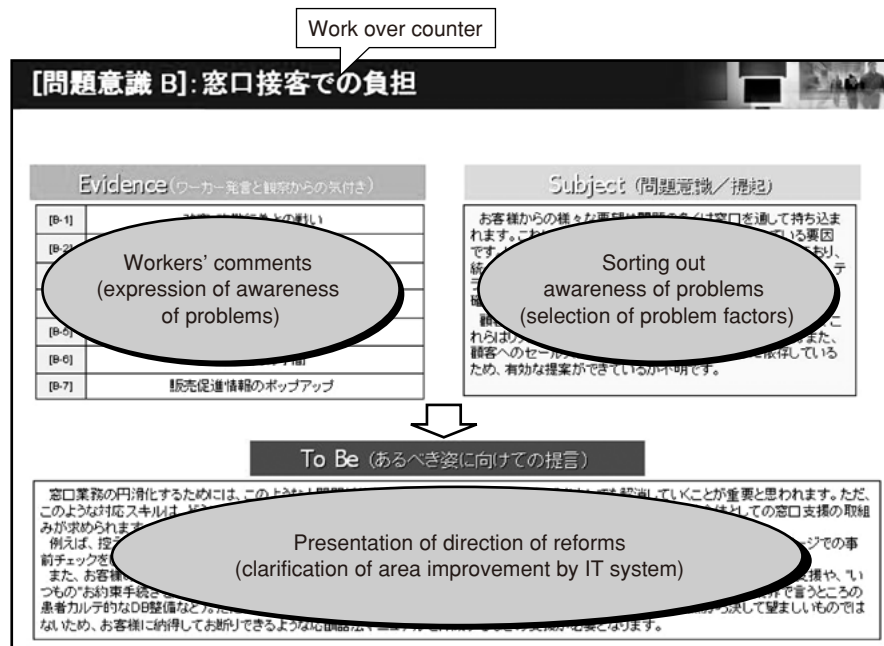


Figure 5
Example of findings sharing sheet.

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