THE EXPERIENTIAL LEARNING PROCESS OF JAPANESE IT PROFESSIONALS

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Abstract

The primary objective of this study is to examine the experiential learning process of Japanese IT professionals, in order to investigate the nature of knowing. In this study we examined how IT professionals acquire job-related skills or expertise through experience. The semi-structured interviews were conducted with 10 high-performing senior managers in consulting divisions and 14 managers in project management divisions. The results suggest that the experiential learning process was different between consultants and project managers. Project managers had step-by-step experience in terms of task difficulty, while consultants had zero-based experience at middle stage. These results suggest that the appropriate experiential learning process depends on the task characteristics and the career stage. The results were discussed from the viewpoint of research on knowing (Cook and Brown, 1999; Orlikowski, 2002), experiential learning (Dixon, 1999; Kolb, 1984), and acquisition of expertise (Ericsson, 1996).

Keywords: experiential learning, knowledge acquisition, knowing, IT professional.

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Suggested track: A - Managing organizational knowledge and competence

1. Introduction

There is a tradition which asserts that organizational learning can be described as a process of three steps: (1) knowledge acquisition, (2) knowledge sharing, and (3) knowledge integration or institutionalization (Crossan et al., 1999; Eisenhardt and Santos, 2002; Huber, 1991). This process suggests that organizational learning occurs when

knowledge acquired by individuals or groups is shared and interpreted in the groups or the organization, and some of it is memorized or institutionalized as organizational routines or structures. Of these three organizational learning steps, many researchers suggest that knowledge acquired by individuals is the basis for organizational learning. For example, Argyris and Schon (1978) suggest that organizational learning is not merely individual learning, yet organizations learn only through the experience and actions of individuals. Huber (1991) mentions that an organization learns if any of its units acquires knowledge. Grant (1996) argues that the primary role of the firm is to integrate individuals' specialized knowledge. Nonaka and Takeuchi (1996) insist that an organization cannot create knowledge by itself, but tacit knowledge of individuals is the basis of organizational knowledge creation. These studies indicate the importance of individual learning for organizational learning.

With regard to the knowledge acquisition process, some researchers have paid attention to the concept of 'knowing' (Cook and Brown, 1999; King and Ranft, 2001; Orlikowski, 2002). Cook and Brown (1999) define knowing as the interaction with the world using knowledge as a tool. They distinguish between knowledge that is possessed and knowing that is a part of action or practice taken to resolve practical issues. According to King and Ranft (2001), the interplay between knowledge and knowing through action is the source of obtaining new knowledge. We could say that knowing corresponds to experiential learning, which includes learning from direct experience, trial-and error learning, and learning by doing (Huber, 1991; Levitt and March, 1988; Miner and Mezias, 1996).

The problem is that there have been only a limited number of empirical studies on the topic of experiential learning and knowing. More importantly, few researchers have examined the contents or characteristics of experience that influences individual learning. The primary objective of this study is to investigate the individual experiential learning process of Japanese IT professionals, focusing on the relationship between experience and knowledge acquisition. My focus here is on how senior IT consultants and project managers acquire job-related skills through experience. By studying these questions,

we can understand better the nature of knowing. In the following sections, I briefly review the literature on the experiential learning and knowing, and point out the limitations of past research. I then propose the research questions and analyze data. Finally, I discuss how experience has an impact on the knowledge acquisition of Japanese IT professionals.

2. Experiential learning

The importance of direct experience or practices in acquiring expertise has been emphasized in several studies. Kolb (1984) proposes a four-stage cycle model, based on Lewin's work, consisting of (1) concrete experience, (2) reflective observation, (3) abstract conceptualization, and (4) active experimentation. According to this model, immediate personal experience is the basis for observation and reflection, which are assimilated into abstract hypotheses or concepts. Then, these hypotheses or concepts guide learners to create new experiences. Kolb (1984) define learning as the process whereby knowledge is created through the transformation of experience. Regarding this process, Dixon (1999) suggests that learning is about interpreting what we experience in the world, and we create our own unique interpretation, which mediates our actions.

The role of experiential learning is also stressed in individual learning theories. For example, in cognitive psychology, Anderson (1983) proposes a skill acquisition model. Anderson (1983) proposed three stages of knowledge acquisition on the basis of Fitt's (1964) study: (1) the declarative stage, (2) knowledge compilation, and (3) the procedural stage. This theory proposes that knowledge is acquired as a set of facts at the verbal level (declarative stage) and that the knowledge is then converted into a procedural form with practice (knowledge compilation). Subsequently, there is fine tuning of the knowledge so that it can be applied more appropriately, and there is a gradual process of acceleration (procedural stage). For example, when learning a foreign language, one starts by reading a textbook to acquire knowledge on how to speak or write. Such knowledge is at the declarative stage. Then, the knowledge is converted into knowledge at the procedural stage through practicing alone or with an instructor. This means that procedural knowledge has several levels, and it cannot be distinguished clearly from

declarative knowledge.

Based on previous research on expertise, Ericsson (1996) proposes the 10-year rule of necessary preparation, which means that it takes at least ten years to attain a high level of performance. He reported that historical and contemporary data show that the highest levels of observed public performance are only displayed after at least 10-year period of intensive preparation in traditional domains. However, it must be noted that 10 years of experience does not guarantee expert performance. Ericsson et al. (1993) suggest that deliberate practice is needed to become a high-performing expert. Deliberate practice refers to the training activities that include a well-defined task with an appropriate difficulty level for the particular individual, informative feedback, and opportunities for repetition and corrections of errors.

Kolb's (1984) learning model, Anderson's skill acquisition model and Ericsson's (1996) 10-year rule indicate not only that people acquire expertise mainly through direct experience, but also that the level of the expertise depends on the quality of experience they have and how do they learn from the experience.

3. Knowing and knowledge

Cook and Brown (1999) distinguish between knowledge and knowing; knowledge is something we possess, but knowing is something we do. Knowing is a part of action or practice taken to resolve practical issues. For example, in apprenticeships, knowledge is not transferred from the master to the apprentice, but the apprentice interacts with the world and uses the master's knowledge to generate the apprentice's knowledge (Cook and Brown, 1999). It can be said that we can acquire tacit knowledge or skills only through direct experience of the real world.

Orlikowski (2002) points out that knowing-in-practice is continually enacted through people's everyday activity. She conducted an empirical study of a geographically dispersed high-tech organization, focusing on the everyday work practices, and identified five practices that allow the firm to enact a collective competence in complex and

distributed product development work. These practices included sharing identity, interacting face to face, aligning effort, learning by doing, and supporting participation.

King and Raft (2001) studied the thoracic surgery certification process in order to examine how surgeons develop their knowledge and knowing through action. They found that disciplined thought regarding the foundational knowledge of a field is necessary prior to building new, specialized knowledge at the individual level. They also argued that the thoracic surgery residency program can be seen as choreographed experiences that provide for building on an existing body of knowledge and developing new knowledge through practice and improvisation.

Although these studies suggest that knowing as an action or practice plays an important role in acquiring tacit knowledge or skills, little is known about the nature of the knowing process. Thus, there is a need for more empirical research in this area. This is an exploratory study focusing on the relationship between experience and knowledge and skill acquisition of IT professionals. I proposed the following research question.

Research question: What kinds of similarities and differences are there between the experiential learning of IT consultants and those of project managers?

I use the term 'experiential learning' to mean learning from direct experience or practices, which is a similar concept to 'knowing'. I can predict that there are both common features and differences between the experiential learning process of IT consultants and those of project managers, because different tasks require different skills acquired through different experience. Past studies on expertise suggest that experts excel mainly in their own domains (Glaser and Chi, 1988). Thus, understanding the experiential learning process in two different job categories can provide insights that will help in clarifying the knowing process.

4. Methods

IT professionals including consultants and project managers were chosen because the source of competitive advantage for the firm is now shifting from manufacturing excellent

products to providing excellent consulting services in the IT industry. By studying IT consulting and project management departments, which are leading areas for providing value-added services and also advanced knowledge management systems, we can better understand the knowledge acquisition process.

The research was carried out in six large firms as part of a wider study on the skills and capabilities of IT professionals conducted on behalf of METI (Ministry of Economy, Trade, and Industry). The semi-structured interviews were conducted with 10 high-performing senior managers in consulting divisions and 14 managers in project management divisions, who had been identified by the HR manager in each of the six firms. A consulting manager is typically in charge of providing ideas to solve a customer's problem, while a project manager is responsible for managing a project to develop information systems that can solve customer problems. The main difference is that the work of project managers involves more group interaction than is the case for consultants.

Table 1 indicates the distribution of persons interviewed in relation to job types and firms. All interviews were tape-recorded and transcribed. The length of these conversations varied from one hour to two hours; a typical interview was about 70 minutes. The subjects included 23 males and 1 female. Approximately half of the participating managers were at the executive level and half at the general managerial level. Their age varied from 38 to 57.

Table 1: Distribution of Respondents, by Job Type and Firm

	Firm						
Job type	A	B	C	D	E	F	Total
Consultant	1	1	2	3	1	2	10
Project manager	3	3	2	0	3	3	14
Total	4	4	4	3	4	5	24

In the interviews, I asked the participants (1) what they thought was the important experience needed to acquire knowledge or skills necessary for their jobs, and (2) what kind of knowledge or skills they acquired through this experience. Time stages were divided into three periods: early stage (first 5 years), middle stage (from 6 to11 years),

latter stage (from 12 years until the present), and I asked the second question at each career stage. I adopted a grounded theory approach (Glaser and Strauss, 1967), and followed the coding procedure proposed by Strauss and Corbin (1998), which consists of three steps: open coding, axial coding, and selective coding. Open coding is the process through which categories are identified and their properties (characteristics of a category) and dimensions (the range along which general properties of a category vary) are discovered in data. Axial coding is the process by which categories are systematically developed and related. Selective coding is the process of integrating and refining the theory whereby categories are organized around a central explanatory concept.

5. Results

Categories and subcategories of experience and skills were drawn from data during open and axial coding. In coding the interview data, I focused on the centrality and importance of certain themes rather than on the frequency with which they are reported, as suggested by Lyles and Mitroff (1980). I then linked the categories of experience with those of skills in each career stage. Fig. 1 summarizes the important experience and acquired skills for project managers and consultants in three career stages. There are three main findings.

Project managers

Early stage	Middle stage	Latter stage
A sub-leader of a small project as a system engineer ↓ Job-related knowledge	A leader of a small and middle sized project ↓ Group management skill Customer relationship skill	A leader of a big project or difficult project ↓ Group management skill Customer relationship skill Analytical skill

Consultants

Early stage	Middle stage	Latter stage
Partial job as a system engineer or professional ↓ Job-related knowledge	A leader of a small and middle sized project Zero-based experience Single-handed experience ↓ Analytical skill	A leader of a big project or difficult project ↓ Customer relationship skill Analytical skills

Fig. 1 Experience and acquired skills for project managers and consultants

First, the knowledge and skills they acquired are classified into four categories: 'customer relationship skill' (e.g., communication with customers), 'management skills of the task group' (e.g., motivating and directing members), 'job-related knowledge' (e.g., knowledge on technology or management), and 'analytical skill' (e.g., problem solving or logical thinking).

Second, there are similarities and differences between consultants and project managers in terms of skills and knowledge they stress. Both consultants and project managers think that customer relationship skills are necessary to perform their job. However, consultants emphasized analytical skills for problem solving or propositions, while project managers stressed the management skills needed to control members of their project groups.

Third, the important experience for acquiring expertise is different between consultants and project managers. Project managers had step-by-step experience in terms of task difficulty to get skills. That is, they tend to acquire knowledge gradually through experience involving small and easy projects to big and difficult projects. One project manager stressed the importance of step-by-step experience:

> *Since project leaders have heavy responsibility, experiencing a big project at the early stage of their career sometimes makes them lose confidence if they*

fail. I think it is better to have experience in managing small projects involving less than 20 members when in one's twenties, and then have experience of managing bigger projects in one's thirties.

On the other hand, consultants had zero-based experience or single-handed experience at the middle stage. After acquiring basic skills and knowledge, they tend to acquire knowledge through participating in projects that they have never experienced before or accomplishing a tough project without assistance from supervisors. A consultant commented:

In the business of retail and distribution, we were able to work with customers in developing application software. For example, we started from zero when developing a system of customer membership in a department store. Then I set out in developing the POS (point of sales) system in a department store. As the department store deals with various products such as clothing, food, and furniture, I could learn about various departments by making the POS system. When a department store started new services such as insurance and ticket reservations, I have to learn not only new technologies such as the database, but also knowledge on ticket operations and tax systems.

These results suggest that the necessary skills and experiential learning processes are different between consultants and project managers. This means that the appropriate experiential learning process depends on the task characteristics and the career stage.

6. Discussion

I explored how IT professionals learn form experience using interview data. Since empirical studies on knowing are limited (e.g., King and Raft, 2001; Orlikowski, 2002), this study provides a critical example about knowing in practice. The results show that IT consultants and project managers have their own unique experiential learning styles, although there are some similarities between them in terms of necessary skills and

experience. The difference in learning styles between IT consultants and project managers may be due to the difference in their task traits. As stated earlier, a consultant is typically in charge of providing ideas to solve a customer's problem, while a project manager is responsible for managing a project to develop information systems that can solve the problems of a customer. The main difference is that the work of project managers involves more group interaction than is the case for consultants. We can suggest that step-by-step experience is necessary to master skills in group management, while zero-based or single-handed experience is needed to acquire analytical skills such as problem-solving skills.

Findings of this study have theoretical implications for research on knowing (Cook and Brown, 1999; Orlikowski, 2002), experiential learning (Dixon, 1999; Kolb, 1984), and expertise (Ericsson, 1996). First, this study suggests that we need to consider the task trait and career stage in examining the knowing process. Knowing, which is defined as the interaction with the world using knowledge as a tool, may be varied among different job categories and career stages. In my analysis, experiential learning patterns are different between IT consultants and project managers especially at the middle and latter stage, but both professions need similar experience to acquire basic knowledge for their jobs in the early stages. This corresponds to King and Raft's (2001) finding that disciplined thought regarding foundational knowledge in a field is necessary prior to building new, specialized knowledge at the individual level.

Second, the results indicate that we have to pay more attention not to experience itself but the interpretation of the experience. Kolb (1984) defines individual learning as the process whereby knowledge is created through the transformation of experience. With regard to the role of experience in developing knowledge, Dixon (1999) suggests that learning is about interpreting what we experience in the world, and the meaning we create mediates our actions. Figure 1 shows that even if both IT consultants and project managers have similar experience such as 'being a leader of a big or difficult project', they acquire different skills from the experience.

Finally, the findings of this study suggest that the features of deliberate practice (Ericsson et al., 1993) depend on the task trait experts engage in. Although Ericsson et al. (1993) argued that deliberate practice should include a well-defined task with an appropriate difficulty level for the particular individual, the results indicate that the difficulty level of the task should be changed according to the task trait. This study suggests that project managers should be trained through step-by-step experience in which they are given moderately difficult tasks, while IT consultants should be trained by having zero-based or single-handed experience, which can be an extremely difficult task for them. This may be because different tasks require different skills. It can be further suggested that liner practice is appropriate for project managers who need to have group management skills, and non-liner practice is effective for IT consultants who have to acquire analytical skills such as problem solving.

The purpose of this study was to examine the experiential learning process of Japanese IT professionals in order to investigate the nature of knowing. Although I obtained some interesting findings, further research on the topic of knowing and knowledge in relation to experiential learning needs to be conducted.

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