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Full Length Research Paper

Does thinking change with roles? A dynamic process of e-learners, e-learning managers and leaders in international accounting firms

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Earlier studies of e-learning were mostly focused on development of e-learning systems, curriculums, and analysis of e-learners' feedbacks. These studies did not address the dynamic conceptual framework of e-learners, e-learning managers, and institution leaders when dealing with e-learning. The sensemaking concept offers a suitable framework for analyzing how each of these roles construct the environment, form interpretations, and take actions. This study conducted semi-structured in-depth interviews with employees and employers involved in e-learning in practical research settings-two international accounting firms in Taiwan. A total of 3 institutional leaders (partners), 7 e-learning managers (directors of HR) and 10 e-learners (auditors) were interviewed. Through categorization, theme analysis and domain analysis, this study extracted their main discourses and explored the sensemaking process of each role to further construct a generalized dynamic model of e-learning.

Key words: Accounting, accounting firms, e-learning.

INTRODUCTION

In order to sustain a competitive advantage, companies invest millions of dollars every year in human resources training (Bamey, 1991). Organizations are currently spending over $250 billon dollars annually on training (American Society for Training and Development, 2004), of which over $16 billon is spent on technology-based training (Anonymous, 2006, December). In addition, millions of learners are enrolling in web-based course (Wirt et al., 2004), and growth rates in technology-based training are projected at 27% annually in the future (Kolbasuk McGee, 2004). Among the technology-based training media, e-learning has become a widely used tool for obtaining skill-based organizational outcomes (Welsh et al., 2003; Zhang, 2004). One reason for the emerging "e-learning revolution" (Welsh et al., 2003) may be the substantially enhancing effect that the integration of new technologies into experiential education has on the learning process in the context of e-learning (Bonk, 2001). Thus, e-learning offers corporations and, indeed, any larger establishment with an educated workforce (Nisar, 2002), a way of improving training while increasing performance initiatives and delivering potentially higher returns on training investments. It is without question that e-learning can be part of a retention strategy (Webber, 2003). The impact of the Internet on the development and delivery of training programs is amazing. In the U.S., over 90% of all public institutions offered some form of e-learning courses and 96.2% of them agreed that e-learning was critical to the long-term strategies of their institutions (The Sloan Consortium, 2004).

In general, e-learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance. In addition, e-learning is based on the following three fundamental criteria (Rosenberg, 2001): first, e-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution, and sharing of the instruction or information; second, it is delivered to the end-user via a computer using standard Internet technology; and, third, it focuses on the broadest view of learning that goes beyond the traditional paradigms of training. In other words, e-learning refers to training initiatives which provide learning material, course communications, and the

delivery of course content electronically through technology mediation (Eddy and Tannenbaum, 2003). Moreover, these e-learning initiatives are thought to dramatically change how organizations conduct training (Horton, 2000; Salas et al., 2005; Welsh et al., 2003).

Many financial institutions invest in e-learning programs to help their employees acquire new knowledge regarding new types of financial services. Success in e-learning is crucial because an unsuccessful effort to implement e-learning will be clearly reflected in terms of the return of investment. However, past failures have shown that investments in e-learning do not necessarily lead to financial returns and training outcomes. One of the most crucial prerequisites for successful implementation of e-learning is the need for careful consideration of the underlying pedagogy, or how learning takes place online. In practice, however, this is often the most neglected aspect in any effort to implement e-learning. Understanding e-learning participants' psychological processes is crucial for institutions to provide effective e-learning programs (Alavi and Leidner, 2001). In face of environmental uncertainties and ambiguity of success, how do e-learners, e-learning managers, and institution leaders interpret and react to promotion of e-learning? In fact, this dynamic interpretation process has never been addressed in previous literature. Although existing models of e-learning effectiveness in information systems have increased the understanding of how technology can support and enhance learning (Alavi and Leidner, 2001; Picciano, 2002), most of the models do not take into account the importance of dynamic social presence (Short et al., 1976). Social presence is "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al.,1976), and has been argued to be a central factor in the creation of the shared learning environment necessary for the most effective e-learning (Gunawardena,1995; Gunawardena and Zittle, 1997; Richardson and Swan, 2003). In addition, "sensemaking" introduced by Weick (1993) is a dynamic and interactive process in which people give meaning to experience. It can be applied to analyze e-learning participants' reaction to the e-learning program.

According to Weick (1993), sensemaking is "a process in which an individual focuses his or her attention to daily life, finds regularities through retrospection, and creates his or her standpoints in this world; the individual is considered to be involved in a continuous process that makes his or her situation rational and predictable." Sackman (1991) mentioned that sensemaking mechanisms include the standards and rules for perceiving, interpreting, believing, and acting that are typically used in a given cultural setting. Basically, sensemaking is an activity or a process interwoven with creations and interpretations. It stresses actions, activities, creations, and interpretations and reinterpretations of them. Besides, sensemaking is to construct, filter, structure, and create facts in order to make subjective ideas more acceptable (Weick et al., 2005). It is a self-driven and active action to make things meaningful and form self-concepts. At the individual level, interpretations are determined by self identity. Everyone's behavioral motivation is to explore and construct a unique self identity. This self identity is developed through internalization and recognition of group opinions and experiences (Ashforth and Mael, 1989). If an organization was viewed as a living entity, members' self identity in the organization then becomes a basic requirement of sensemaking (Ashforth and Mael, 1989).

Sensemaking at the organizational level is based on a sense of self (Wheatley and Kellner-Rogers, 1996). When people perceive they are a part of the organization, an identity will be shaped. Once this identity is set in motion, it becomes the sense-making process of the organization. This process determines the goals and systems of the organization. However, the sensemaking process varies by different environment context. According to March (1984), organizational life is as much about interpretation, intellect, metaphors of theory, and fitting the history into an understanding, as it is about decisions and coping with the environment. To find answers from the problem setting, organizational members need to engage in sensemaking of the meaningless and uncertain setting and then find cues from chaos. In other words, what was treated will be selected as the "things" of the situation, set the boundaries of the attention to it, and impose upon it a coherence, by which people know what goes wrong and what should be improved. In addition to the external environment, internal context is also influential to the sensemaking process (Daft and Weick, 1984). For instance, organizational structure and information processing framework have considerable effects on sensemaking. Essentially, strategies affect an organization's enactment of the environment and link the manager's interpretations to it. Shotter (1993) argued that management is to induce a set of clear and appropriate rules, explain the problem situation, and construct a coherent "structure" of discrepant and disordered events to make the present and the future easier to understand.

Weick (1995) proposed that sensemaking is a process of committed interpretation of behavior. Commitment binds an individual to his or her behavior. The behavior then becomes an undeniable and unchangeable aspect of the person's world, and when he or she makes sense of the environment, behavior is the point on which constructions or interpretations are based. Simply put, this process can be described as a rationalizing process, in which behavior is rationalized by referring to the features of the environment that supports it. In the sensemaking process, commitment can be seen in past actions, social justification of the actions, and subsequent activities that support or reinforce the justification (Weick et al., 2005). That is, commitment links "behavior", "explanation", "social support", and "expectation" to form an interactive model, which can further become a causal

loop that stabilizes and reinforces the subsequent behavioral model. To be succinct, commitment occurs cumulatively and progressively. New justifications and new meanings are rooted in old ones and appear progressively. In conclusion, sensemaking is a tool for understanding organizational members' views about the ambiguous and uncertain environment and conveying their views to other members in the organization.

In a knowledge-based economy (Drucker, 1993), many organizations recognize that knowledge is vital to their competitive advantages (Boisot, 1998). To respond to this need, corporations continuously train their employees in relation to professional knowledge and skills. With the aid of information and communication technology, many organizations have transformed their training programs into CELPs (Corporate E-Learning Programs). The use of network technology to deliver training is the latest trend in the training and development industry and has been heralded as the e-learning revolution (Welsh et al., 2003). E-learning is technology-based leaning such as computer-based learning, web-based learning, virtual classroom and digital collaboration. It is widely believed that e-leaning technologies are going to change and revitalize education and training (SRI Consulting, 2000; Cone and Robinson, 2001) thereby bringing new benefits to society. Rosenberg (2001) stated that e-learning had the following benefits. First, it lowers costs. Second, its content is more timely and dependable. Third, it is a just-in-time learning approach. Fourth, it builds universal communities. And finally, it provides an increasingly valuable learner service. Learning is the retention and transfer of knowledge to new and different situations. Of all the educational technologies that have exhibited great potential, e-learning appears to be the most promising. Essentially, the e-learning system predominantly provides information, not teaching instruction or other pedagogical supports for learning (Liaw and Huang, 2003; Vosniadou, 1996).

In order to maximize the advantages of formal training, an organization needs to connect the content of training programs to the required job tasks (Cunningham and Iles, 2002). CELPs embed job tasks in the training programs and are widely accessible from many locations in the company at any time; for these reasons, CELPs constitute an effective learning tool for employees and can strategically develop employee professional competency. Institutions' need to own a CELP is especially pronounced in the business because it is an information-intensive industry in which employees who effectively serve their customers must continuously develop their professional knowledge and skills.

A 2008 report released by PricewaterhouseCoopers (PwC), one of the world's largest accounting firms, revealed that despite the global economic slowdown, PwC created more than US$28.2 billion revenue in 2008, a 14% growth from the previous year. Its revenue from "auditing services" was particularly remarkable, reaching US$13.8 billion (Wu, 2008). These statistics indicated that audit services are an important part in the business. Therefore, this study selected the auditing departments of two international accounting firms in Taiwan and applied the sensemaking concept to construct a dynamic process model of CELP to understand how the e-learners, e-learning managers, and institution leaders respectively develop their insights, interpretations, and actions in face of corporate e-learning.

METHODOLOGY

In this study, research data was collected via in-depth interview and subjects' dynamic processes in e-learning were analyzed based on the concept of sensemaking. Fineman (1983) pointed out that in-depth interview is a suitable method for sensemaking.

Subjects

Purposive sampling method was adopted to select research subjects in this study. Unlike probability sampling which stresses randomness and representativeness of the subjects, purposive sampling can help this study obtain more abundant cases to extract important information regarding the research objective (Patton, 1990; Stake, 1994). To understand how e-learners, e-learning managers, and institution leaders construct the environment for, form interpretations of, and take actions in e-learning, two international accounting firms in Taiwan were selected and conducted semi-structured in-depth interviews with 3 institutional leaders (partnering CPAs), 7 e-learning managers (directors of the human resource department), and 10 e-learners (auditors) respectively. Their main discourses were extracted through categorization, theme analysis and domain analysis to construct a generalized dynamic model of e-learning. The two international accounting firms in this paper are among the top four accounting firms in Taiwan. They have branches in northern, central, and southern Taiwan. A summary of the basic data of the subjects is provided in Table 1.

Before the interview, all the subjects received a copy of the interview abstract via email. The interviews with CPAs (leaders) and auditors (e-learners) were conducted according to the one-to-one approach. Because the tasks handled by directors of human resource and training development (e-learning managers) were widely varying and highly specific, the one-to-many approach was adopted to obtain more comprehensive data from them in one time. During the interview, subjects were asked to recall their "e-learning processes", including the "perceived external environment" and "actions taken to cope with changes in the environment". In addition, subjects were led according to their responses to obtain more of their in-depth opinions. Various principles on processing qualitative data were also followed (Spradley, 1979; Yin, 1987), including (1) tape the interview under consent of the subject and transcribe the taped results; (2) encourage subjects to use their own language or ways they can better express themselves; (3) organize the interview records and notes within 24 hours after the interview to get hold of the instantaneity of the data; and (4) carefully read the transcribed script and confirm with the subjects via phone or email if any section is unclear. The above principles could help this study enhance the reliability of the collected data.

Instruments

Based on the evaluation models proposed by Kirkpatrick (1959, 1996), Phillips (1997, 1998), and Chung and Yang (2006), a tentative interview abstract was developed for each type of subjects,

Table 1. A summary of the basic data of the subjects.

Type of subjects	Code	Sex	Age	Length of service	Position	Education	Certificate
CPA	11A	Male	42	15	Partner	MA	R.O.C. CPA
	11B	Male	39	15	Partner	BA	R.O.C. CPA
	21A	Male	38	14	Partner	MA	R.O.C. CPA AICPA CPA CIA
Directors of human resource	12A	Female	44	17.5	Director	MA	
	12B	Female	36	12.5	Senior manager	MA	
	12C	Female	32	3.5	Senior manager	MA	
	22A	Female	36	14	Senior manager	BA	R.O.C. CPA
	22B	Female	32	10	Manager	BA	R.O.C. CPA
	22C	Male	34	10	Manager	MA	
	22D	Female	32	10	Manager	BA	
Auditors	13A	Male	28	1.2	L2 associate	MA	R.O.C. CPA
	13B	Male	32	4	Senior associate	MA	R.O.C. CPA
	13C	Male	35	7	Manager-level associate	MA	R.O.C. CPA
	13D	Female	38	8	Senior manager-level associate	BA	
	13E	Female	35	12	Senior manager-level associate	BA	
	23A	Female	25	0.2	L1 Associate	MA	AICPA CPA
	23B	Female	27	4	Senior Associate	BA	
	23C	Male	25	3	Senior Associate	BA	R.O.C. CPA
	23D	Female	27	4	Vice manager-level associate	BA	
	23E	Male	34	10	Manager-level associate	BA	R.O.C. CPA

namely auditors (e-learners), directors of human resource and training development (e-learning managers), and partnering CPA (leaders). For improving interview questions' content validity, three accounting professors and two e-learning experts were invited for reviewing interview questions to assess what were essential questions. A three-point Likert scale was assessed to each question. The three-point Likert scale included 1 as "It is not necessary to ask the question", 2 as "It is useful, but not essential to ask the question", and 3 as "It is essential to ask the question". Essentially, the items that got a one-point score were deleted, the items that got a two-point score were revised, and the items that got a three-point score were kept. Five undergraduate accounting students were invited to examine which items were unclear. Each item was assessed by a three-point Likert scale. The three-point Likert scale included A as "Unclear question", B as "Needed modification", and C as "Clear question". Usually, the items that had an A-point were deleted, the items that had a B-point were revised, and the items that had a C-point were kept for the interview.

Analysis methods

Two analysis methods were employed. One was categorization and theme analysis (Miles and Huberman, 1984), and the other was domain analysis (Spradley, 1979). The categorization and theme analysis was performed first. Based on subjects' descriptions, the first-level concepts were extracted and concepts shared by different subjects were induced to extract abstract concepts at a higher level. Basically, theoretical concepts at this level would be considered. Later, each subject's categorization framework was constructed for sensemaking (concepts at Level 1, theme and related dimensions at Level 2). The domain analysis was intended to derive a generalized model from research data. Overall, a consistent finding was induced from various data and concepts through cross validation and construct the finding according to the domain of the theme. At last, an overall framework to derive a generalized model was summarized.

RESULTS

In this study, all subjects were assumed to have a unique sensemaking process. However, from their unique processes, common factors affecting their sensemaking still could be derived. Because the subjects in this study consisted of three groups, including e-learners, e-learning managers and institution leaders, and the e-learner group was relatively larger than the other two. Marks et al.

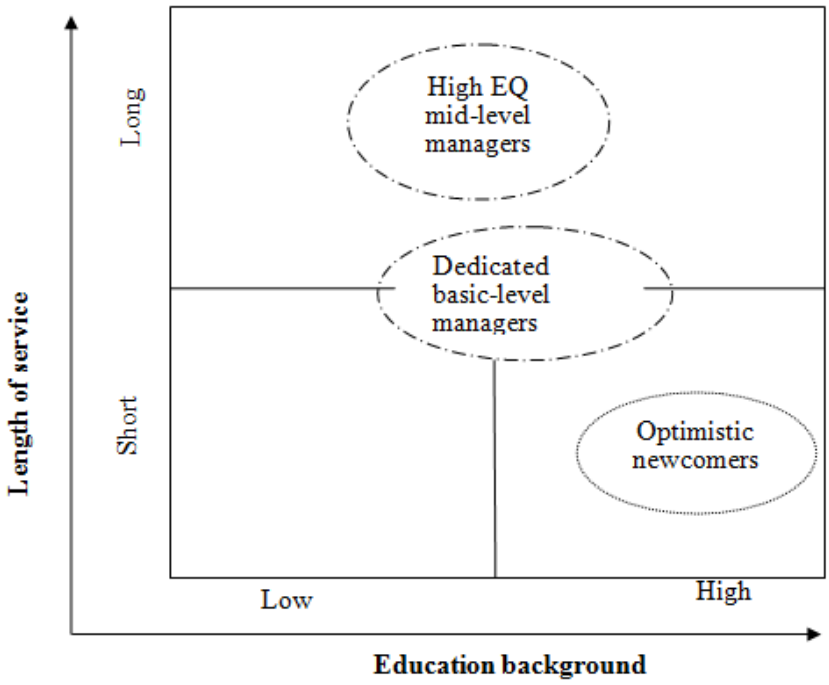

Figure 1. Classification of e-learners.

(2005) and Wang and Haggerty (2006) were referred to divide e-learners by length of service and education background into three sub-groups, including "optimistic newcomers", "dedicated basic-level managers", and "high EQ mid-level managers", as shown in Figure 1. The qualitative data of the five groups were analyzed to derive a general model of sensemaking processes. In the construction of each group's sensemaking process, the basic elements of sensemaking proposed by Weick (1993) was used to clarify the primary ideas of subjects in each group. For instance, one's interpretation of "self identity" or "the external environment" will affect his or her "actions", and "committed interpretations" will be made for "actions". The interview results are presented in the following format. Subjects' responses are remarked to indicate who provides the response to what question at when, and where it is located in the transcript. For instance, 2009-10-05-11A-01-01 denotes "the first paragraph of response to the first question provided by subject coded 11A on Oct 5, 2009".

The sensemaking process of "optimistic newcomers"

Optimistic newcomers were e-learners with length of service shorter than two years and holding a master's degree.

Sources of sensemaking

For this group of participants, there were two sources of sensemaking, including "identity in the organization" and "internal context of the individual".

(1) Identity in the organization: These subjects were mainly freshmen in the job market and not familiar with the job content, so they were afraid of making mistakes and would follow directions of their supervisors to win recognition in the organization.
*"My job is to follow the plans made by executives (2009-10-05-13A-09-*02)".
(2)Internal context of the individual: In their development of identity in the organization, "the optimistic newcomers" showed high level support for e-learning policies and courses promoted by their firms.
"The e-learning courses offered are good and diverse (2009-10-05-13A-02-01)". "The e-learning courses offered by the firm do not have time limitation (2009-10-05-13A-14-01), can be repeated (2009-10-05-13A-14-02), embedded with audio effects and graphics (2009-10-16-23A-14-01), and not including too much learning content in one page (2009-10-16-23A-14-02) ".
Basically, their interpretations derived from their identity in the organization affected their subsequent actions.

From interpretations to actions

Actions are mainly guided by interpretations. "The optimistic newcomers" showed high level support for e-learning courses promoted by their firms, so they also demonstrated high utility of the courses in their actions. "I use the e-learning courses frequently. I sign in for the

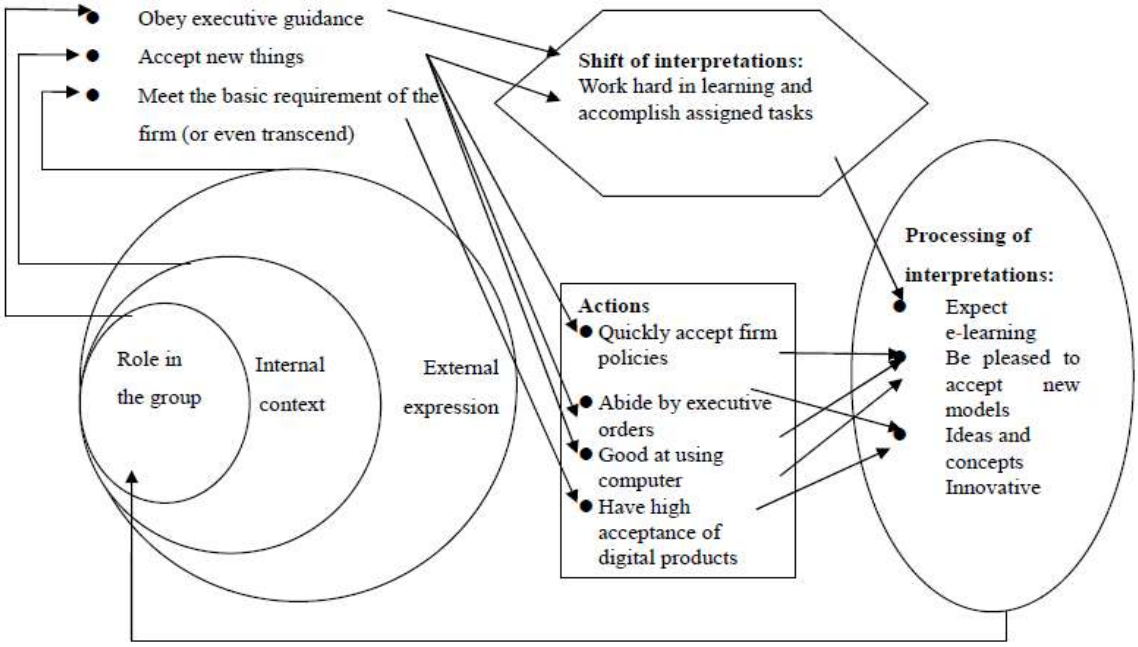

Figure 2. The sensemaking of "optimistic newcomers".

course whenever I am available (2009-10-05-13A-15-03)".

"I use the courses frequently. I was required to complete 3~4 courses within about one month after I entered this firm, but I had two years to finish the IFRS part (2009-10-16-23-15-01) ".

Shift of interpretations

Not all interpretations result in actions. Some of them may transform into other related interpretations or induce justification of certain behavior or role. In this study, transformation of one interpretation into another or justification was called as "shift of interpretations". For instance, subjects' interpretation of their "identity in the organization" would elicit their actions to "support e-learning" and also lead them define and adhere to their role by "working hard in learning and accomplishing assigned tasks".

"In most cases, seniors would provide guidance to us, and we just had to follow their guidance and accomplish assigned tasks (2009-10-16-23A-03-01)".

Basically, shift of interpretations can result in actions or committed interpretations. Committed interpretations generally arise from actions, but individuals may sometimes show committed interpretations of certain important ideas or their roles through shift of interpretations.

From actions to committed interpretation

The interview results suggested that the subjects would engage in persuading others and themselves their intention after taking an action. This post-action justification is called "committed interpretation". Generally, committed interpretation is the "idea" or "vision" that affects subjects. For instance, some subjects mentioned "e-learning can help auditors solve difficulties at work" and "e-learning can help auditors apply their knowledge to practice". This kind of committed interpretation of e-learning "as helpful for auditors" was mentioned more than once. In other words, "the optimistic newcomers" agreed with the e-learning policy of their accounting firm and internalized it as a part of their identity with the organization.

"E-learning can help auditors solve difficulties at work (2009-10-05-13A-12-02)".

"E-learning courses should be taken in advance. About 70~80% of them are really helpful for or applicable to work (2009-10-16-23A-13-01)".

"E-learning can help us apply acquired knowledge to practice (2009-10-16-23A-14-05)".

"E-learning can help us enhance our organizational cohesion as it can facilitate accumulation of knowledge and transfer of experiences (2009-10-05-13A-27-04)".

The sensemaking framework of *"optimistic newcomers"* is illustrated in Figure 2.

The sensemaking process of "dedicated basic-level managers"

"Dedicated basic-level managers" were e-learners having served the firm for about 3-7 years and holding a bachelor's degree or a master's degree.

Sources of sensemaking

(1) Identity in the organization: Subjects in this group were the backbone of the accounting firms. They did not have the final decision in audit operations but had to be responsible for multiple tasks, including planning of audit schedule, reviewing working papers, and communicating with customers and subordinates. They played critical roles in the group and spent a considerable amount of time on their tasks.

"My jobs include audit planning, auditing, reviewing working papers… (2009-10-16-23C-09-03)".

"Auditing is my main job... (2009-10-16-23B-09-01)"."Communication, planning, reviewing working paper, and other related jobs…(2009-10-16-23D-09-02)".

(2) Internal context of the individual: While their work time was shared by multiple heavy tasks, they could only concentrate their efforts on audit related tasks. As to the e-learning courses promoted by the firm, they would rather take a passive attitude to avoid adding more burdens on themselves. They maintained their participation in e-learning at the minimum required level that would not undermine their performance.

"Because all the courses are in English, they are very effort-taking. I will certainly take mandatory courses but not in a serious manner (2009-10-16-23B-15-01)".

"I feel satisfied enough if I can go through all required courses once (2009-10-05-13B-15-03)".

From interpretations to actions

Actions are mainly guided by interpretations. "The dedicated basic-level managers" showed a passive attitude toward e-learning courses promoted by their firms, so their utility of the courses was also low.

"I would take mandatory courses and pass the exams, and I seldom take other courses (2009-10-16-23D-15-01)".

"The utility rate is low. I do only the assignment (2009-10-16-23C-15-01)".

"I take only required courses and have never taken any elective one (2009-10-05-13B-16-01)".

Shift of interpretations

Some interesting phenomena were found in their process from interpretations to actions. Some interpretations did not directly result in actions but affected actions through shift of interpretations. However, the results of shift of some interpretations were about justification of the role, past views, and even behavior. For instance, many of them stressed that they did not utilize e-learning to a higher extent because "the courses are all in English", "I do not understand the plan of e-learning courses and cannot expect the benefits of e-learning" or "we are really too busy".

"*All the courses are in English! So we just click all the way (2009-10-16-23B-13-05)".*

"I do not have much understanding of the overall plan and cannot expect the benefits of e-learning (2009-10-05-13B-13-01)".

"I take only mandatory courses. Taking elective courses may occur to employees in other department, not ours. We are just too busy (2009-10-16-23B-16-01)".

"I would certainly be fully involved in it if I had enough time. Since I have limited time, it is more important for me to work on my audit jobs first (2009-10-16-23B-08-01)".

From actions to committed interpretation

The committed interpretations that these subjects made were mainly interpretations of why they took only mandatory courses. These interpretations echoed their earlier views, including "I really have no time for e-learning courses" and "I think I will not take the courses seriously".

"I just use the spare time to take the courses. Since we are all so busy, we won't take the courses seriously (2009-10-16-23C-14-04)".

"Not many people care about these courses…(2009-10-05-13B-04-09)".

"The physical courses are better! You will be forced to put your current work away. You are also allowed to ask questions and discuss in class (2009-10-05-13B-14-11)".

The sensemaking framework of *"dedicated basic-level managers"* is illustrated in Figure 3.

The sensemaking process of "high EQ mid-level managers"

"High EQ mid-level managers" were e-learners with length of service in the firm about 8~12 years and holding a bachelor's degree.

Sources of sensemaking

(1) Identity in the organization: Subjects in this group had long duration of service and rich experiences. Most of them had been promoted to the manager or the senior manager level. The problems they needed to deal with were no longer limited to audit operations.

"Customer problems (2009-10-05-13D-12-02)…, leadership problems are more important (2009-10-05-13D-12-03)".

"I need to deal with professional problems and communication with customers (2009-10-16-23E-12-02)".

(2) Internal context of the individual: "High EQ mid-level managers" perceived the importance of "communication" and "management" in their development of role identity. Although they recognized the benefits of e-learning, they believed that their needs could be better satisfied by physical courses.

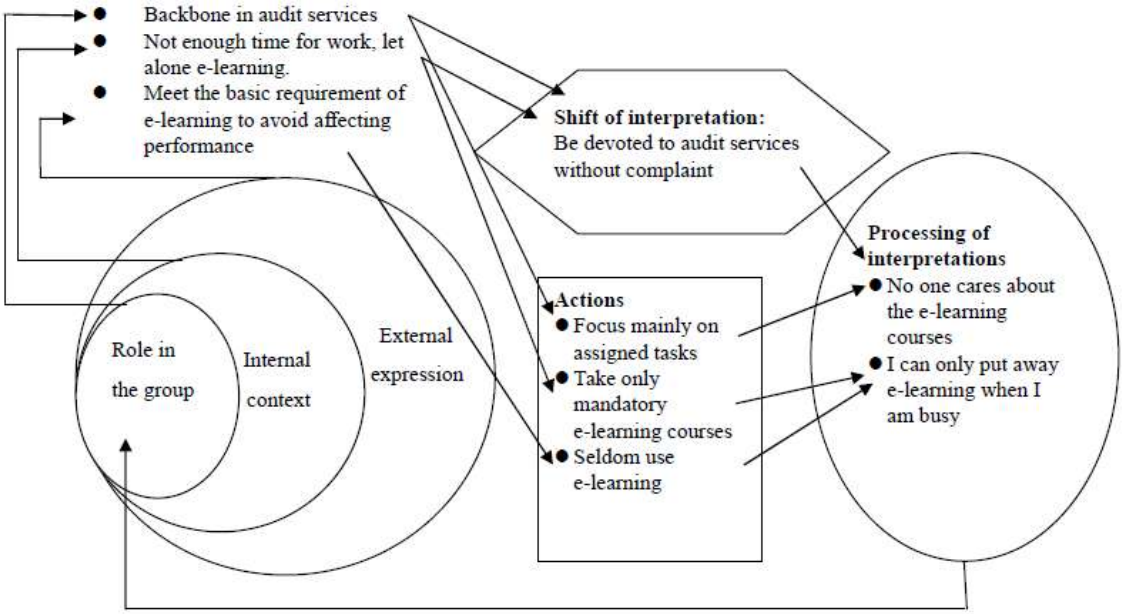

Figure 3. The sensemaking of "dedicated basic-level managers"

"I think the benefits of e-learning are limited….Communication and management courses should be offered through face-to-face instruction (2009-10-05-13D-12-05)".
"The functions of e-learning are okay…They can be used to support physical instructions. In fact, e-learning is an alternative learning method. Its main drawback is that it offers less interaction (2009-10-16-23E-13-02)".

From interpretations to actions

The interpretations of these subjects resulted in actions mainly on physical courses.
"In fact, the higher level we are promoted to, the less we can get from e-learning. For instance, some management skills or knowledge related to practical development can hardly be instructed through e-learning (2009-10-16-23E-03-04)".
"Face-to-face instruction allows us to discuss our experiences (2009-10-05-13E-12-06)".
"E-learning cannot provide such environment (2009-10-05-13E-12-08)".

Shift of interpretations

In terms of shift of interpretations, this group of subjects believed that with the ascending of their position, their communication and transaction with others would become more complicated and harder to standardize. As a result, they considered that e-learning courses could not satisfy their needs in these aspects.

"The accounting firm needs to directly cope with business….In business, you cannot control everything in the transaction with others. It is hard to cope with this issue through e-learning (2009-10-16-23E-14-04)".

From actions to committed interpretation

The interview results suggested that the subjects in this group recognized the benefits of e-learning but considered them as very limited. Their committed interpretation of e-learning was that e-learning could be applied to standardized professional knowledge and physical courses about communication should be offered through face-to-face instructions.
"Employees at higher positions need more physical courses (2009-10-05-13D-04-23)". "E-learning can offer supporting functions and not be used for core curriculums (2009-10-05-13D-13-01)".
The sensemaking framework of subjects in *"high EQ mid-level managers"* is illustrated in Figure 4.

The sensemaking process of "well-rounded human resource directors"

"Well-rounded human resource directors" referred to e-learning managers who design and manage e-learning courses.

Sources of sensemaking

(1) Identity in the organization: The subjects in this group worked in the supporting department of their firms. They

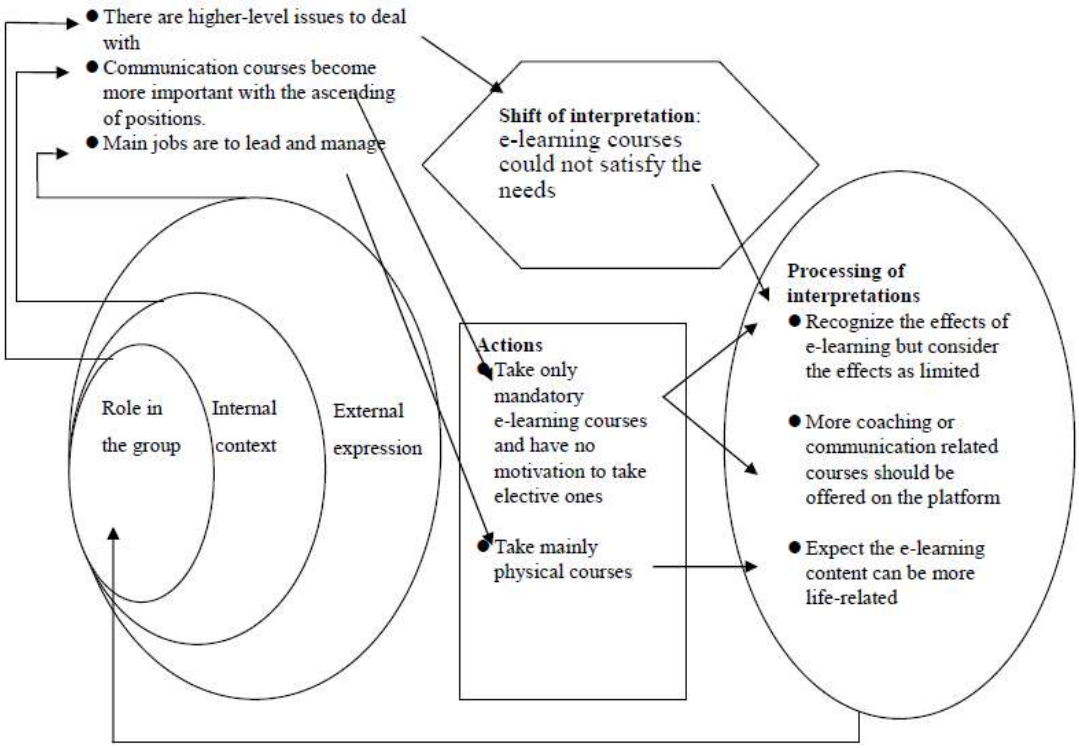

Figure 4. The sensemaking of "high EQ mid-level managers"

had to design and manage training courses, including physical courses and e-learning courses, according to company policies.

"Our way of training, whether through physical courses, e-learning or self-study, is to offer materials to employees and ask them to study (2009-10-16-22D-03-02)".

"There are courses according to the global headquarters' policies and some courses are about the additional policies developed by our firm (2009-10-26-12A-03-04)".

"Our job is to manage these courses and design some local courses according to demands of each department (2009-10-16-12A-02-10)".

(2) Internal context of the individual: "Well-rounded human resource directors" needed to coordinate courses and control training costs at the same time. Because e-learning has the advantages of low-cost and high flexibility, they all believed that the proportion of e-learning courses will be on the increase.

"Cost reduction is a benefit (2009-10-16-22A-24-02)". "It can be repeated! In other words, if you don't get it, you can view it again…In classroom, the teacher will move on to the next section if you don't ask questions. I think e-learning offers higher learning effectiveness (2009-10-26-12A-27-01)".

"*We spend millions of dollars each year on physical courses. On average, training of one new employee costs about NT$10,000 a week (2009-10-26-12B-24-02)".*

"If we outsource the physical courses, we need to spend NT$10,000 for each employee each week, not including the pay for lecturers (2009-10-16-22D-24-01)".

"I think there will certainly be more e-learning courses. This is a future trend… (2009-10-26-12A-35-01)".

From interpretations to actions

The interpretations of these subjects resulted in design of courses based on blended learning method, gradual increase of e-learning courses, and well-rounded in all aspects, including cost reduction and learning effectiveness.

"The new learning method is that you need to take three e-learning courses first and one classroom course later, and after the classroom course, you need to take another e-learning course. This learning method offers the best effectiveness (2009-10-26-12A-35-03)".

"You need to go through the training in three stages, including e-learning, physical instruction, and e-learning. Now many of our courses have been also classified into two sections. Some courses are about simple concepts and thus can be offered via e-learning to save costs. Physical courses are necessary only when you have acquired the simple concepts (2009-10-16-22A-35-02)".

Shift of interpretations

These subjects recognized the benefits of e-learning but

also admitted that no mechanism is available for examining the effectiveness and benefits of e-learning. Therefore, they could only do a better job as managers of human resources through effective control of costs.

"In terms of knowledge and competitiveness, I think the effects of e-learning are positive. If they were not positive, we would not have established so many databases and courses. As to revenue, it is hard to estimate whether e-learning has contributed to the growth of our revenue. I think it has…more or less…It is just hard to measure (2009-10-26-12A-29-01)".

"E-learning is more instant and less time-limited. I think these advantages are satisfactory. The learning effectiveness, as I was talking about business impact, should be tested (2009-10-26-12A-29-01)".

"E-learning benefits acquisition of knowledge and development of competitiveness. However, its effects on the revenue are hard to estimate and quantify (2009-10-26-12A-20-01)".

From actions to committed interpretation

The interview results suggested that all subjects in this group agreed that e-learning is beneficial but can be further improved, especially in its interactivity and examination mechanism.

"I think the interactivity of e-learning can be improved…and so can the evaluation of learning outcomes (2009-10-26-12A-29-01)".

"There are no supplementary measures for evaluating e-learning outcomes. This issue is brought up every year, but no better solution has been found (2009-10-16-22A-19-03)".

The sensemaking framework of subjects in *"well-rounded human resource directors"* is illustrated in Figure 5.

The sensemaking processes of "practical partnering CPAs"

"Practical partnering CPAs" were the leaders of the accounting firm who are responsible for maximizing the total profits of the firm.

Sources of sensemaking

(1) Identity in the organization: The subjects in this group were leaders in the firms. As their mission was to maximize firm profits, they would certainly provide full support to e-learning that they believed it could save costs. However, because they were eager to business promotion, they were possibly unable to participate in e-learning frequently.

"I provide full support to e-learning but cannot always participate in it. This is a trend, a learning method without constraint of time and space (2009-10-16-21A-09-01)".

"I seldom take e-learning courses, but I fully support e-learning because it is basically a tendency (2009-10-16-21A-09-01)".

(2) Internal context of the individual: In the development of role identity, the partnering CPAs had to solicit businesses and reduce costs. E-learning allowed them to enhance auditors' knowledge and quality of their human resources with limited resources. They certainly recognized the effects of e-learning and would use its test grades as a basis for employees' performance evaluation.

"Physical courses are offered during office hours, but e-learning…Employees seldom use e-learning courses during office hours (2009-12-07-11B-08-08)". "I think e-learning is helpful for acquisition of knowledge. If you force employees to take and complete e-learning courses, they will certainly show growth in knowledge and competitiveness (2009-10-16-21A-27-01)".

"Of course, the e-learning test results will be referenced in the performance evaluation (2009-12-07-11A-09-01)".

From interpretations to actions

These subjects' interpretations resulted in actions that supported the e-learning policy, including sending mail to notify e-learners of new lessons, encouraging employees to shoot short digital films, promoting to create various e-learning databases, and monitoring employees' participation in e-learning. It should be noted that most of the current e-learning lessons are all in English and do not have Chinese captions. Although the partnering CPAs thought that the lessons would be better offered in Chinese, they did not take any action to improve them due to cost considerations.

"We will encourage our employees to edit short films about professional morality and then select the top films through voting (2009-12-07-11A-17-01)".

"Suppose you have to pay NT$300 for each hour of this course and you skip 3 hours, NT$900 will be deducted from your salary. This mechanism is intended to force you to complete e-learning courses. If you fail to comply with the requirement, the head of the learning center will be notified and pay attention to your e-learning conditions (2009-10-16-21A-17-02)".

"In terms of learning effectiveness, courses in Chinese are certainly better. But the cost is too high (2009-12-07-11B-14-04)".

Shift of interpretations

Most of the subjects in this group recognized the effects of e-learning on cost reduction and were dedicated to promotion of e-learning.

"Speaking of cost, we should find classrooms for physical courses…Because we have so many employees (2009-10-16-21A-33-03)".

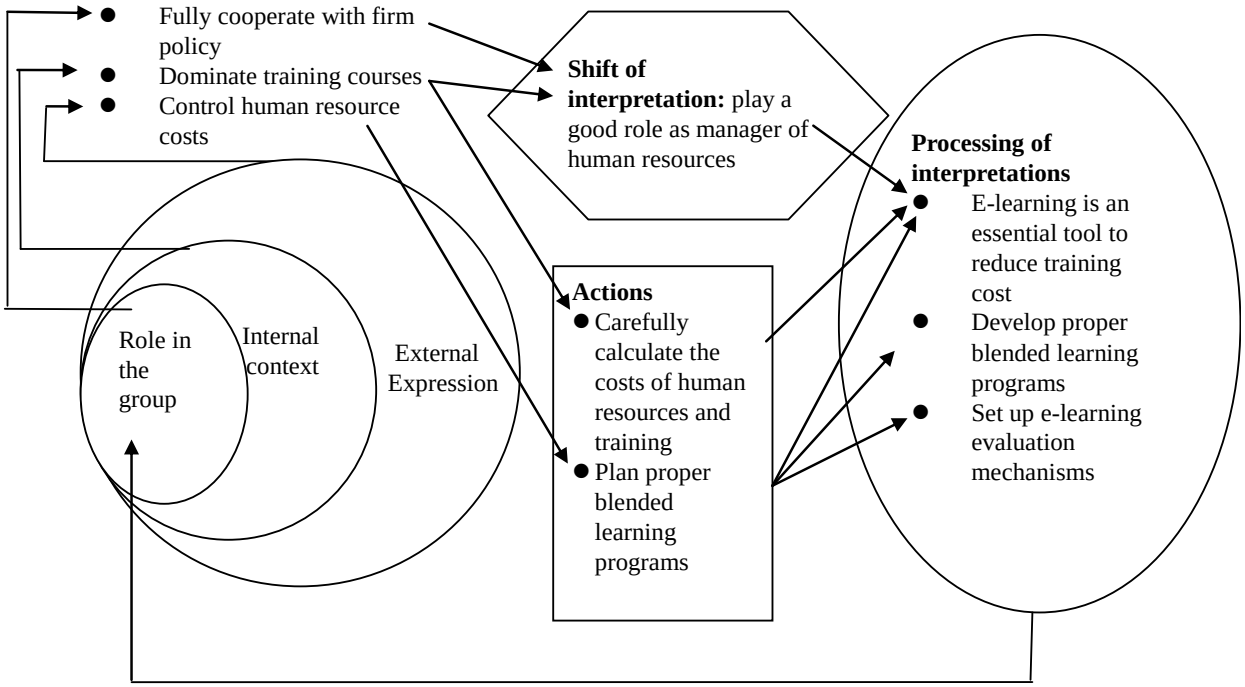

Figure 5. The sensemaking of "well-rounded human resource directors"

"Under the constraint of time and space, we are unable to gather all the employees. Some employees may miss certain physical courses if they are busy with something previously arranged (2009-10-16-21A-33-07)".

"When your firm reaches a certain scale, you cannot always offer physical trainings (2009-12-07-11A-27-02)".

"Different means are required for different goals (2009-12-07-11A-27-03)".

From actions to committed interpretation

From the standpoint of leaders, partnering CPAs recognized the effects of e-learning and also mentioned that e-learning content should be future improved, especially in "content quality" and "interactivity".

"We should develop e-learning. As much as I know, with our gradual promotion of e-learning, physical instructions may be slightly adjusted and reduced (2009-10-16-21A-33-02)".

"The content is still the primary focus (2009-12-07-11A-33-17)".

"Of course, I hope that the education cost can be reduced… However, the quality of e-learning courses can be improved (2009-12-07-11B-33-01)".

"Liveliness and interactivity are insufficient (2009-12-07-11B-32-02)".

"The e-learning courses should be designed to be interesting to learners (2009-12-07-11A-33-18)".

The sensemaking framework of subjects in *"practical partnering CPAs"* is illustrated in Figure 6.

DISCUSSION

A generalized dynamic model of subjects

Based on the above analysis results, the dynamic sensemaking process would be inferred to involve three steps, including "interpretation", "action", and "committed interpretation". Interpretation also includes interpretation of "identity" and interpretation of "interpretation", which is defined as "shift of interpretation" in this study.

According to Turner (1982), "identity" can be divided into "personal identity" and "social identity". Personal identity refers to one's relation with his or her son /daughter or friend. It involves "emotional" elements. Social identity refers to social roles, such as one's status of being a university teacher. It involves "instrumental" elements. In this study, the subjects tended to show stronger "social identities" than "personal identities".

As to shifts of interpretations, they should be classified by the shift results. The shifts can be classified into "supportive shift", "shift to generate new actions", and "shift to generate new discourses". "Supportive shift" means stressing or clarification of interpretations; "shift to generate new actions" induces actions not through the path from interpretations to actions; "shift to generate new discourses" results in important discourses of some ideas like committed interpretations. Based on the above discussion, the following propositions were proposed:

Proposition 1: "Social identity" was the core factor affecting the sensemaking process of subjects in each group.

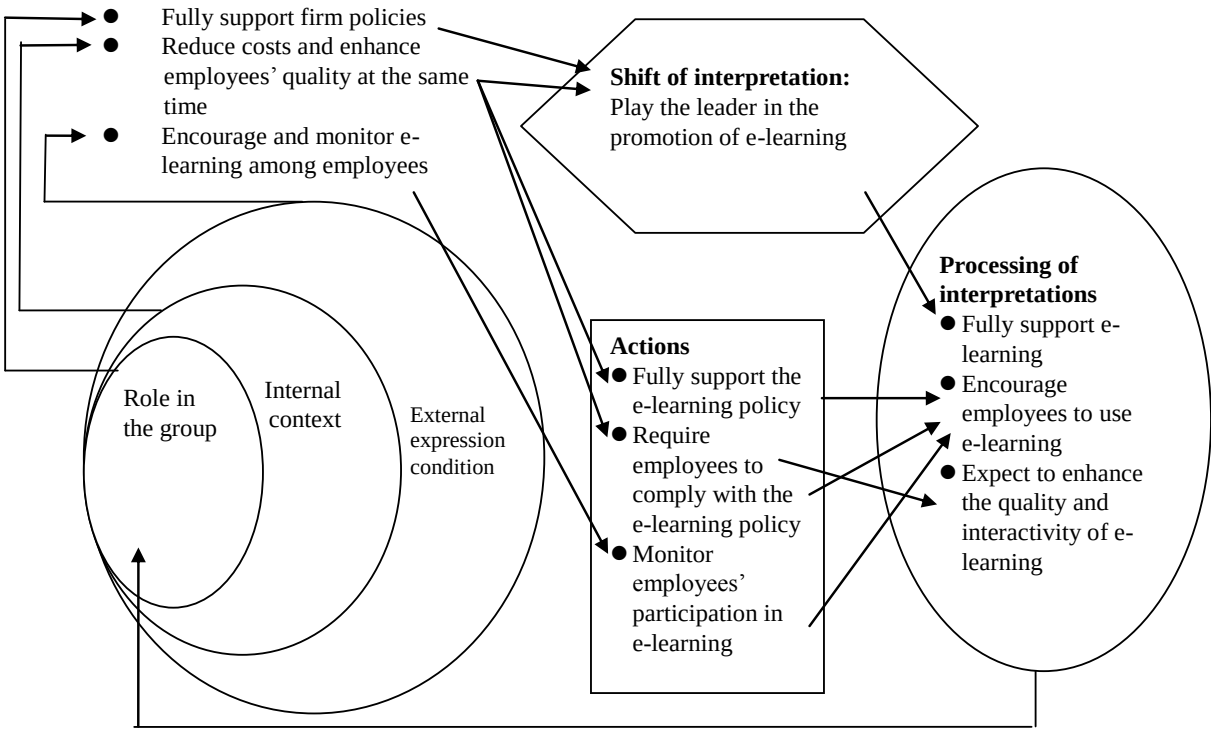

Figure 6. The sensemaking of "practical partnering CPAs"

Proposition 2: "Social identity" further affected subjects' interpretation of their internal context.

Proposition 3: In subjects' interpretation of the internal context, their "supportive shift of interpretations", "shift of interpretations to generate actions" and further "shift of interpretations to generate discourses" were induced and summarized. As to actions, the interview results suggested that subjects' subsequent actions depended on their interpretations. Therefore, the following propositions were proposed.

Proposition 4: The subjects' actions were mainly affected by their "social identity", "interpretation of the internal context", as well as "shift of interpretations" mentioned in Proposition 3.

Proposition 5: The subjects formed a system of value about "the concept of e-learning" and "meanings of their jobs". The important concepts from individual to organizational levels are called "committed interpretations".

Proposition 6: The systematic "committed interpretations" were logically coherent and consistent with subjects' "social identity", "interpretation of internal context", and "shift of interpretations", and "actions".

From the propositions, the links from interpretations to actions, from actions to committed interpretations, and from committed interpretations to actions were respectively supported by Weick's (1983) arguments – "thinking provokes action", "thinking qualifies action", and "thinking intensifies activity". Based on these propositions, the generalized dynamic process of each group of subjects was summarized in Figure 7. In this figure, red arrow denotes the primary relation between elements, black arrow denotes the secondary relation between elements, and blue dotted line denotes the possible relation between elements.

The mental model of the subjects

Through analysis of dynamic processes, each group of subjects was found to have a different mental model. According to Mitroff and Kilmann (1978), their mental models were classified into sensation- thinking (ST), sensation-feeling (SF), intuition-thinking (NT), and intuition-feeling (NF). It was attempted to apply the mental models proposed by Mitroff and Kilmann (1978) to analyze the dynamic process of each group of subjects in Figure 8. The results suggested that "well-rounded human resource directors" tended to explain some of their important ideas and views using inferences and analyze the benefits of e-learning by quantitative costs. Therefore, their mental model could be classified as "ST". "Dedicated basic-level managers" were the backbone of their firms and had strong enthusiasm with their audit services. They emphasized that they would complete e-learning courses if they had available time. They preferred to

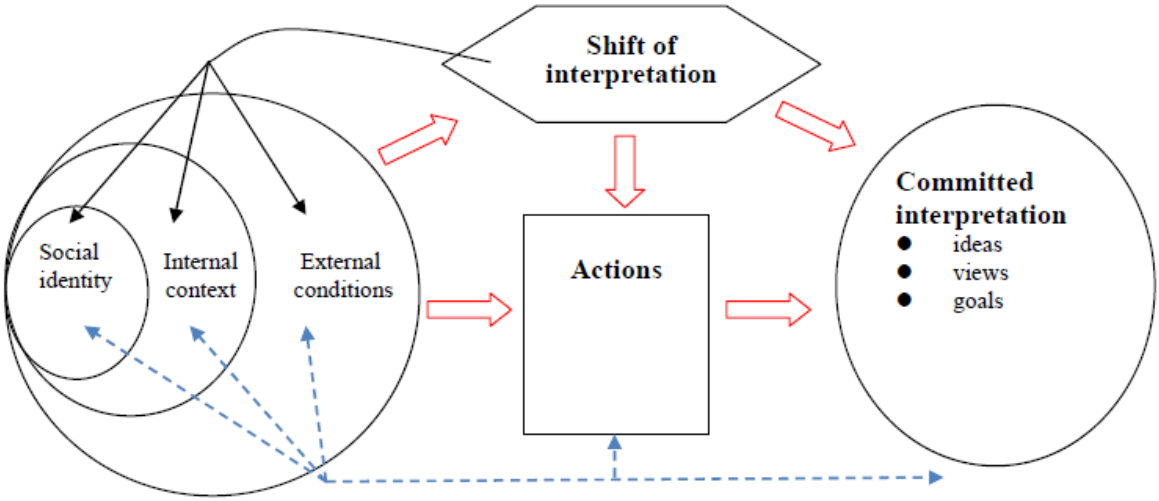

Figure 7. The generalized dynamic process of the subjects.

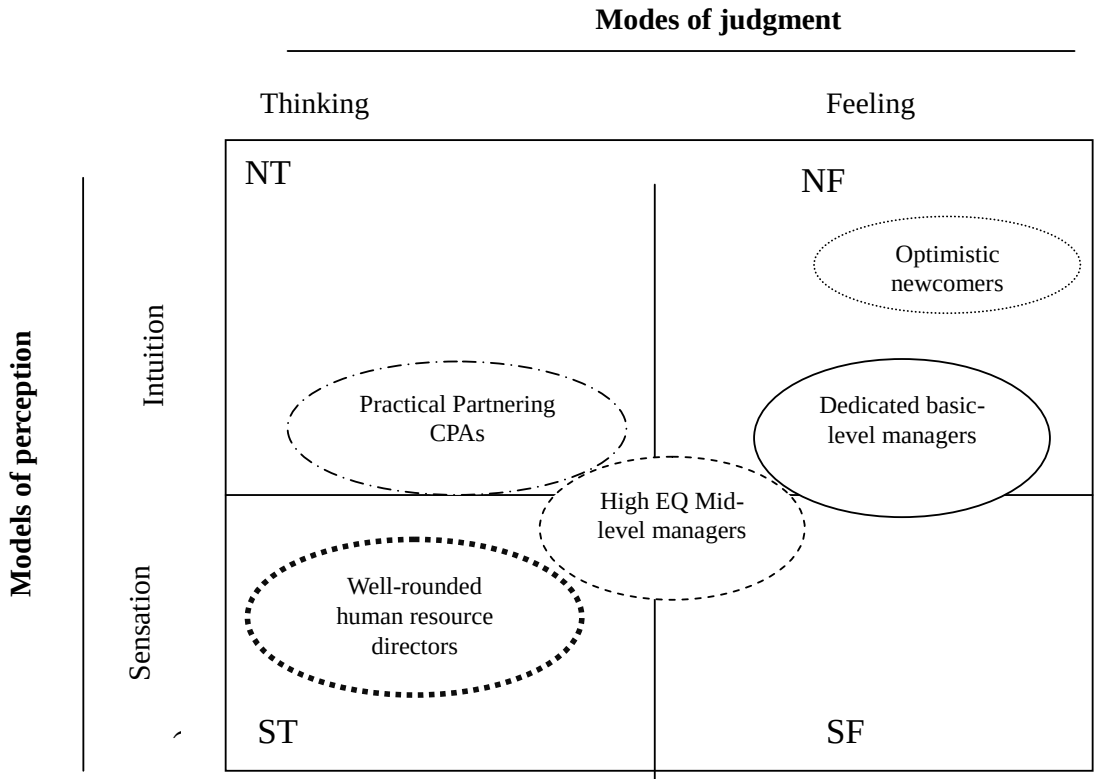

Figure 8. Application of the four mental models proposed by Mitroff and Kilmann (1978).

justify their views by "actions" and "committed interpretations". Therefore, their mental model could be positioned between "NF" and "SF". "High EQ mid-level managers" perceived that the problems they dealt with were at higher levels and would analyze if e-learning could satisfy their needs before taking actions. They were sensitive to the environment and good at analysis. Therefore, their mental model fell mostly between "ST" and "SF". "Optimistic newcomers" were new to the society and had strong passion for learning new things. They were compliant with firm policies, so their mental model was positioned at "NF". Finally, "practical partnering CPAs" paid attention to performance figures of the firm and were sensitive to the trends in the industry.

Therefore, they were positioned at “NT”. In sum, the five groups of subjects would repeatedly review their actions, thinking, and role identity and establish consistent and logical linkage between “identity—action—interpretation” in face of the e-learning policy. Besides, related analysis of their mental models showed significant difference between different groups.

Conclusion

The growing literature on e-learning education shows how technological, economic and scientific factors are contributing to the development of a new educational panorama (Kirschner and Kester, 2007). E-learning programs are uniquely different around the world. The situation is distinctly different across countries. The advantage of E-learning is clear. It can match the needs of nontraditional students, increase the training facilities available to traditional learners, supply companies with cost efficient yet effective training options (Kirschner et al., 2007). However, some disadvantages of e-learning are identified such as lack of peer contact and interaction, high initial costs for preparing multimedia content of learning materials and also substantial costs for its maintaining and updating, as well as the need for flexible tutorial support (Hamburg et al., 2003). In the virtual e-learning environment, learners have to be highly motivated and responsible because all the work they do is on their own (Del- Vecchio and Loughney, 2006). In such a new setting, all e-learning participants may constantly reconfigure, renew, or learn new capabilities along with technology, content, and education expertise to embrace the educational innovation-“E-learning” (Teece et al., 1997).

Consistent with the arguments of DeSanctis and Poole (1994), creating an effective e-learning environment is not simply a matter of providing technology to learners; better understanding how technology can support learning is more important. Another suggestion is to train individuals in the use of e-learning technology and in the behaviors necessary for successful navigation of the e-learning environment before allowing course enrollment. However, previous literature did not address the dynamic conceptual framework of e-learners, e-learning managers, and institution leaders when dealing with e-learning. This is what this study wanted to discover.

In summary, the contributions of this study are threefold. First, the dynamic processes of e-learners, e-learning managers, and institution leaders in face of uncertainties in the e-learning environment were respectively unveiled. Based on the sensemaking concept proposed by Weick (1993) and Weick et al. (2005), the sensemaking processes of each group of subjects were analyzed in face of e-learning and found that “committed interpretations” are logically coherent and consistent with subjects’ “social identity”, “interpretation of internal context”, “shift of interpretations”, and “actions”. Second, the main discourse from the dynamic framework of each group of subjects was extracted to understand their internal context in face of e-learning.

Third, based on the categorization method proposed by Mitroff and Kilmann (1978), with the promotion of one’s ranking in the firm, one’s mental model would move from “NF (intuition-feeling)” to “SF (sensation-feeling)” and “ST (sensation-thinking)”. The mental model of institution leaders fell at “NT (intuition-thinking)”, revealing that subjects at higher positions would have more practical thinking in e-learning and tended to analyze benefits and costs before making decisions about e-learning. This finding validated the idea that “thinking changes with roles” when they cope with e-learning in the firm.

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