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A new standard of on-line customer service process: Integrating language-action into blogs

Heng-Li Yang *, Chi-Lun Liu

Department of Management Information Systems, National Cheng-Chi University, Taipei, Taiwan

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Abstract

Blogging, which is a relatively new medium in personal communication and collaboration, can help enterprises overcome some difficulties in conventional customer service management. However, blog functions remain limited. This study proposes a novel standard for managing customer service processes, in which language-action is integrated into blogs to leverage blog characteristics. This standard comprises new specified dialogue patterns for collaboration, suggested customer service processes, and supporting system architecture. Furthermore, a scenario is provided that demonstrates use of this standard.

Keywords: Blog; Collaboration; On-line customer service; Language-action perspective; Dynamic workflow management system

1. Introduction

Conventional production-oriented enterprises have shifted towards a customer-oriented approach [18]. Thus, nurturing long-term relationships with customers is crucial to success for customer-oriented enterprises [13]. To deliver high-quality services, enterprises must provide customer services that meet customer needs.

Traditionally, the nature of providing customer service is intangible and the processes involved are complex [10]. In this era of the Internet, most enterprises prepare website content, such as a knowledge base [5,21] and FAQs, in advance of customer visits. Customers can access the websites to find needed information. Additionally, most on-line firms also utilize web-based workflow management systems such as on-line shopping cart software. Customers can use these workflow management systems to request services that may require cross-departmental collaboration. Hence, web content and workflow management systems can effectively eliminate the intangibility and complexity of customer services.

However, preparing web content and predefining workflows for all possible customer requirements is impossible and not economically viable. Successful websites must allow customers to contact employees [19]. E-mail remains a dominant communication tool that supports on-line contact. However, using e-mail cannot make on-line customer service processes tangible, simple, or manageable. An improved tool for assisting and managing on-line customer service processes is required.

Blogging is a relatively new mainstream on-line publishing and human interaction platform [20,24]. Many companies have already started building their own blogs to support customer service channel. Compared with e-mail and forums, blogs offer organizations powerful and easy-to-use mechanisms to manipulate blog contents, aesthetics and functionality. Hence, blogging can help organizations increase their on-line service quality and outline their merits and features in competitive business environments. Additionally, blogs provide customers a very convenient channel for communication; that is, customers can read, search, subscribe to, and comment on blog content.

Blogs were originally designed for personal use and lack a collaboration mechanism for business contexts. To leverage the advantageous characteristics of blogs, this study integrates

* Corresponding author. Department of Management Information Systems, National Cheng-Chi University, 64 Section 2, Chihnan Road, Mucha Dist., 116, Taipei, Taiwan. Tel.: +886 2 29387651; fax: +886 2 29393754.
E-mail addresses: yanh@nccu.edu.tw (H.-L. Yang), tonyliu@ms4.hinet.net (C.-L. Liu).

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language-action into blogs to control collaborative processes. Language-action is the essence of collaborative work [6]; hence, it is a solid foundation for designing collaboration functions.

This study presents a novel standard for integrating language-action into blogs to support management of on-line customer service processes. First, this work develops a set of standard dialogue patterns for collaboration based on language-action to enhance blog mechanisms to clarify and trace collaboration. Second, a standardized on-line customer service process is proposed. Third, the architecture of the proposed customer service system is elucidated, including *enhanced blogs* and other required sub-systems.

2. Literature review

This section first discusses the difficulties inherent in managing on-line customer service processes. Sub-section then introduces the characteristics of blogs that may overcome the difficulties and discusses the limitations in using blogs in an organizational context. Finally, the concept of language-action is applied to overcome blog limitations.

2.1. Difficulties in managing on-line customer service processes

Enterprises typically attempt to decrease errors and shorten delays in customer service environments [12,21]. On-line customer services require manpower. Thus, enterprises face unavoidable errors and delays in customer services. Four possible reasons account for errors or delays in service.

- Misunderstanding: Poor communication can result in misunderstanding, which is not acceptable in customer services [15]. Misunderstanding can cause service errors and delays. Hence, avoiding misunderstandings is necessary whenever possible.
- Customer question diversification: Customer inquiries and problems can vary widely [23]. On-line customer service processes must resolve numerous questions.
- Dynamic process: Due to the diversity of customer questions, on-line customer service processes must not be static and should be formulated dynamically when employees execute a process. Hence, managing dynamic processes is required in successful on-line customer service.
- Departmental barriers: A single department typically cannot handle all customer questions alone. Hence cross-departmental collaboration and communication are essential to customer service [12,21]. An on-line customer service system should assist enterprises in overcoming departmental barriers.

Some standards exist that are relevant to customer service. The service synergy model [2] has five steps that guide effective customer service: understanding customer needs; setting service standards; communicating about services; delivering a service; and, maintaining a service culture. Service system design and management [4] is a five-stage process that encompasses customer identification, customer-need surveys, service-system design, service delivery, and service recovery. Although these two models can structure customer service processes and support tool development, they assume that a service standard for each requirement can be planned.

A relatively new customer service standard [27] utilizes five criteria: customer insight; organizational culture; information and access; delivery; and service quality and timeliness. This standard covers a wide range of considerations and underlines the importance of co-operative working in customer services. However, the standard does not provide a detailed approach that guides flexible co-operative customer service. These three standards do not address misunderstandings, diverse customer questions, or communication among distributed departments.

Various technologies, such as e-mail or forums, are available on the web. Choosing an appropriate tool and developing an effective standard are crucial if enterprises are to overcome these difficulties.

2.2. Blogs

Blogs, are a relatively new personal communication and collaboration tool [20,30]. Blogging is a new form of publishing and media [20]. Precisely, blogs are websites using a dated log format for publishing periodical information. Blogs were designed originally for personal use and are typically used as personal on-line diaries. Blogs are linked together via syndication [14]. Users can navigate, search, and publish multimedia content on blogs and comment on content on other blogs [16].

From a technological viewpoint, blogging has five common characteristics [14].

(1) Separation of content from presentation: Blogging systems contain a workflow management mechanism for managing content without manipulating a blog's presentation.
(2) Templates: Templates for presenting content are flexible and powerful mechanisms allowing users to alter functionality and aesthetics.
(3) Blog Application Program Interface (APIs): Blogging clients are available through application programming interfaces for editing content. Furthermore, numerous clients can post to multiple blogs simultaneously.
(4) Information management: Blogging systems provide various functions for managing information such as backup/restore mechanisms, automatic content indexing, search capabilities, and assigning role and privileges.
(5) Syndication: Users can use Really Simple Syndication (RSS) to subscribe to blog articles. Additionally, TrackBack is a syndication method that allows a blog to cite another blog whose content has been referenced, allowing users to track discussions. Thus, blogs enable peer-to-peer communication and blog networking.

Blogs are valuable for personal and organizational use [3,26]. For business, blogs can facilitate distributed conversations [16] and may become a primary way of interacting with

other people on-line [25]. Enterprises can publish attractive content easily on their blogs and gain immediate customer feedback. Many enterprises have started using blogs, such as GM's FastLane Blog (http://fastlane.gmblogs.com/) and Nissan's TIIDA Blog (http://blog.nissan.co.jp/TIIDA/), in an organizational context.

The following blog characteristics can overcome difficulties associated with customer service mentioned in Section 2.1.

- Customer comments: Misunderstanding customer questions can elicit incorrect decisions or erroneous solutions. Blogs provide a comment mechanism allowing customers to comment on any solution flaw immediately. Senior employees can also examine blogs and comments on solutions. Hence, the comment mechanism on blogs can help enterprises eliminate and manage misunderstanding.
- Organization self-presentation: Customers often encounter problems and require professional help. Blogs are a good platform for self-presentation. Enterprises, departments, product teams, and employees can post content on their blogs outlining their merits and functional features. Customers can select an organization according to its blog content. Furthermore, inside blogs (within an organization) could delineate publish work reports, which can help collaborating employees communicate in large or multi-national corporations.
- Blog syndication: The dynamic essence of processes causes managerial difficulties associated with customer services. Syndicating customer service articles is an effective method of managing complex and dynamic processes. Customers and organizations can use the TrackBack feature to trace the progress of a customer service process, and use *RSS Readers* to obtain new articles from multiple blogs to access an overview of customer services.
- Full-text search and multimedia: Enterprises frequently have to meet new customer requirements in rapidly changing markets. By accessing blogs, employees can obtain the most up-to-date knowledge not yet stored in a FAQs document. Hence, using a full-text search to acquire the latest knowledge is crucial for resolving customer questions. Additionally, the function of authoring multimedia-format content in blogs is helpful for coping with various tasks related to customer services.

E-mail and forums are commonly used for on-line customer services. However, e-mail and forums are relatively less useful than blogs in supporting customer service. The following is a list of some observations about e-mail. (1) Senior employees frequently lack the time to examine customer service e-mails to identify misunderstandings. (2) Searching e-mails to respond to customer questions is time consuming. (3) E-mail is limited in its ability to display of a series of messages simultaneously. (4) Employees can use e-mail address books to locate collaborating partners; however, address books generally do not store information about department responsibilities and are hard to share. The following is a list of shortcoming associated with forums. (1) The function of authoring multimedia content for forums is inferior to that for blogging. (2) As each department can build its own message board or forum, and customers and employees can post any new topic, department message boards can become a mixed jungle and cannot present a clear image about its features. (3) Compared with blogs, forums are not a good method to link related articles, especially for messages on different department message boards or forums.

Table 1 presents a summary of tool characteristics to overcome difficulties associated with on-line customer services.

However, several limitations are associated with the use of blogs in an organizational context for on-line customer services. These limitations are as follows.

- Comment intervention management: Comments can have various meanings (e.g., canceling request, or revealing errors) that may appear in customer service processes. Existing comment mechanisms in blogs are incapable of managing comment intervention in processes.
- Access control: Customer information and enterprise internal information are often sensitive. Enterprises should give external customers, internal customers (e.g., departments and project teams) and suppliers different access authorities. The access control function of blogs is too simple for business.
- Dynamic process and conversational message management: Generating different processes for each kind of unique cases is necessary; this is essential to customer services. The quotation (TrackBack) and subscription (RSS) functions of blogs can support free forms of conversation paths. However, blogs do not support formulating, executing, and managing standardized dynamic processes and the related conversational messages.

Collaboration is essential in organizational contexts. However, blogs are not designed to support collaboration. To address these limitations, a solid theoretical understanding of collaboration is necessary to enhance blog functionality.

2.3. Language-action

Language-action is a philosophy that reveals the reality about effective coordination and job accomplishment in works [6]. Language-action indicates that an action is represented and guided through language [8,29]. The foundation of the language-action philosophy is speech act theory [29], which

Table 1
Tool characteristics that support customer service processes

	Misunderstanding	Customer question diversification	Dynamic process	Departmental barrier
Blogs	Comment	Self-presentation, full-text search, multimedia	Syndication (TrackBack, RSS)	Department self-presentation (daily work report)
E-mail	Reply, carbon copy	Attached file, e-mail address book	Send a new mail, reply, forward, carbon copy	E-mail address book
Forums	Reply	Full-text search, various topic message board	Post a new topic, reply	Department message board

indicates that speech acts typically precede actions and that some speech acts are actions [6].

An inseparable speech act has three components [1,11]. (1) Locutionary act: A speaker says something meaningful. (2) Illocutionary act: A speaker says something that has the force of illocutionary act such as a statement or an order. (3) Perlocutionary act: A listener's behavior is affected by what is spoken.

Searle identified five illocutionary points [22,29]: (1) Assertive: A speaker says or expresses how things are, such as an argument or prediction. (2) Commissive: Causing the listener to do something in the future, such as accept or promise. (3) Directive: The speaker tries to get other people to do something. (4) Declarative: The speaker changes the world by saying something, such as declaring or approving. (5) Expressive: A speaker expresses feeling and attitudes.

Habermas classified speech acts into three categories [9]. (1) Regulative speech acts: The speech acts, such as command or agreement, regulate interpersonal relationships. The speech acts reveal what is appropriate in a specific cultural context, which has its own values and traditions. (2) Expressive speech acts: A speakers expresses hopes, feelings, or intentions, which reveal desires in a speaker's subjective world, but does not assert a fact or regulate anything. (3) Constative speech acts: A speaker asserts a fact, and emphasizes that language represents conditions, such as an asset or prediction, in an objective world,.

The language-action perspective (LAP), which is based on speech act theory, is also a computing perspective [28,29]. Denning [6] indicated that people use language in three primary ways from the LAP. (1) Conversation for action: Speech acts can be performed with explicit cooperation from others. A simple example is a sequence of four speech acts between persons *A* and *B*. First, *A* makes a request to *B*. Second, *B* promises to do the thing *A* requested. Third, *B* acts on what s/he has promised. Finally, *A* declares the request complete. (2) Conversation for possibilities: A manager typically makes a decision that declares that a group will move toward a new context. The group then needs to invent new possible actions to respond to threats or opportunities. (3) Conversation for disclosure: Some disclosures reveal concerns. That is, other people reveal worldviews that determine how we understand actions and practices in the world and how we express them. In short, people must often initiate different actions in different contexts. Conversation for possibilities and disclosure create contexts for coordination [6]. Additionally, the inference can be drawn from the above discussions. Directive, commissive, assertive, and declarative illocutionary acts correspond to conversations for action; declarative illocutionary acts correspond to conversations for possibilities; assertive and expressive illocutionary acts correspond to conversations for disclosure.

Dietz [7] distinguished between two collaborative process patterns based on the perspectives presented by Searle and Habermas. The patterns indicate that a request can generate a sequence of language-actions, and a question can induce an assertion. However, Dietz overlooked the fact that a question can generate decision-making and expressed wishes. The information regarding managerial decisions and desirable wishes is also crucial to collaboration in a business context.

Briefly, language-action is the essence of collaboration. Proposing process patterns of business collaboration based on language-action is feasible. However, complete collaborative dialogue patterns are needed to enhance the collaborative functions of blogs.

3. Proposed standard for managing on-line customer service processes

This study presents a new standard for managing on-line customer service processes, this standard has three parts: (1) dialogue patterns for collaboration based on language-action; (2) a suggested process for dealing with on-line customer services; and, (3) a system architecture for assisting the dialogues and processes in customer services.

3.1. New dialogue patterns for collaboration

To handle the various requirements of on-line customer services, employees must be able to communicate with different collaborators in different ways on a case-by-case basis. Standardizing and structuring communication processes are desirable to increase their clarity, simplicity and manageability. A thorough solution is to specify the fundamental patterns to control collaborative work (e.g., actions, decisions, wishes, and facts). This study develops a set of dialogue patterns for collaboration based on previous works [6,7,9,22,29] (Table 2). In a dialogue, a message's function can be classified as one of five message types. Additionally, there are four conversation purposes. (1) Conversation for action: This pattern requires cooperation with others. A series of messages appear; for example, *A requests B*, *B promises* something, *B delivers* on what was promised, and *A accepts*. (2) Conversation for decisions: This purpose is to change a context. Two message types, *question* and *decide*, are utilized. This collaboration pattern originates from conversation for possibilities. (3) Conversation for wishes: This conversation discloses a person's internal/subjective world, and is based on Denning's conversation for disclosure and Habermas's expressive speech acts. (4) Conversation for facts: This conversation for facts occurs when a conversation is utilized when facts about the external/objective world are needed, and is based on Denning's conversation for disclosure and Habermas's constative speech acts.

The proposed dialogue patterns are more complete than those in the study by Dietz [7], which did not consider conversation for decisions and conversations for wishes. With appropriate information system support, employees can use

Table 2
Dialogue patterns for collaboration

Conversation purpose \ Message type	Directive	Commissive	Assertive	Declarative	Expressive
Action	Request	Promise	Deliver	Accept	
Decision	Question			Decide	
Wish	Question				Express
Fact	Question		Assert		

these fundamental dialogue patterns to generate structured communication processes when executing customer service jobs. That dialogue patterns can help employees handle various customer requirements is expected.

3.2. Suggested on-line customer service process

To help firms resolve difficulties associated with on-line customer services, this study presents a novel on-line customer service process (Fig. 1). This process has two sub-processes—the main customer service process and comment intervention management process. The main customer service process has three stages: opinion analysis, opinion performing, and opinion completing. These stages are described as follows.

- *Opinion analysis*: This stage has three tasks. During task 1, a customer expresses an opinion. An employee clarifies the customer opinion and identifies customer requirements

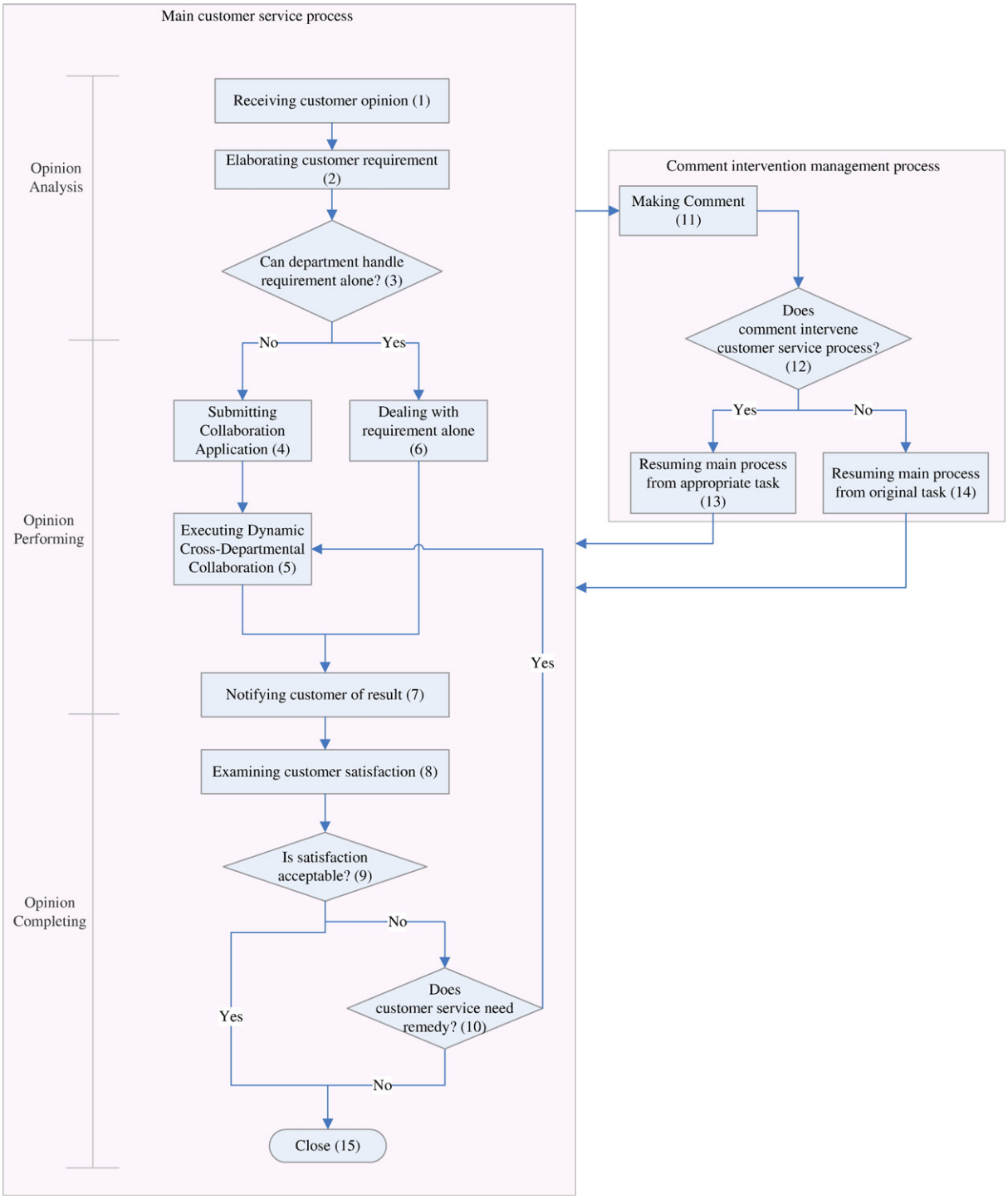

Fig. 1. Proposed on-line customer service process.

during task 2. Next, the employee decides whether these requirements can be met by the business unit alone or whether cross-departmental collaboration is needed (task 3).

- *Opinion performing*: During this stage, employees can meet customer requirements in two ways. If a need requires cross-departmental cooperation, an employee should submit a form to a manager during task 4, and organize a series of tasks for cross-departmental collaboration (task 5). If the business unit can meet the requirement alone, the requirement would be handled by the single business unit without the manger's explicit permission (task 6). After the requirement is met, the employee notifies the customer (task 7).
- *Opinion completing*: This stage has four tasks. The customer fills out survey form (task 8). When the level of customer satisfaction is adequate, the customer service job is complete (tasks 9 and 15); otherwise, a manager can determine whether this job needs redoing or closes this process directly (tasks 9, 10, and 15).

When a customer or an employee makes a comment, this event triggers a comment intervention management process. An employee then decides whether the comment should be considered by the main customer service process (task 12). When the comment is to be considered, the employee chooses an appropriate task to restart the process; otherwise, the employee resumes the process and continues with the original task.

The proposed on-line customer service process is a template. The instances of the process are flexible. An employee could choose go to the next task or return to a prior task in the process. A comment may intervene in a main customer service process. Additionally, during task 5, an employee can arrange a sequence of task instances at the run-time based on collaboration patterns.

3.3. Proposed system architecture and deployment

To support the collaborative on-line customer service process, a complete customer service system is proposed. In addition to *enhanced blogs* and two *RSS Readers*, the other sub-systems are the *Satisfaction Survey System*, *FAQ System*, *Organizational Memory Information System (OMIS)*, and *Access Control System*.

- *Enhanced blog*: The enhanced blog has five modules (top of Fig. 2). Most popular blogs have three original modules (cubes on the left of Fig. 2): *content management*; *presentation template management*; and, *full-text search*. The proposed *enhanced blog* has two additional modules (cubes on the right of Fig. 2): *language-action syndication module (LASM)* and *dynamic process management module (DPMM)*. The *LASM* and *DPMM* provide functions for maintaining metadata of blog posts. In the *LASM*, language-action is integrated into the TrackBack and RSS protocols, thereby offering rich semantics (e.g., question and request) that enhance the simple quotation meaning provided by TrackBack. The *DPMM* can be utilized to manage dynamic contexts, such as task, process, and job, of a blog post.
- *RSS Reader*: The *RSS Reader* provides functions for automatically parsing metadata of blog posts and displays blog posts according to specific criteria. Employees can use the *RSS Reader* to retrieve important blog articles based on job, listener, or speaker for executing collaboration of on-line customer service. Moreover, managers can use the *RSS Reader* to receive managerial information regarding issues such as cross-departmental cooperation or poor customer satisfaction.
- *Satisfaction Survey System*: Enterprises can produce and distribute survey forms to measure customer service satisfaction. Customers can use this system to fill out the surveys.

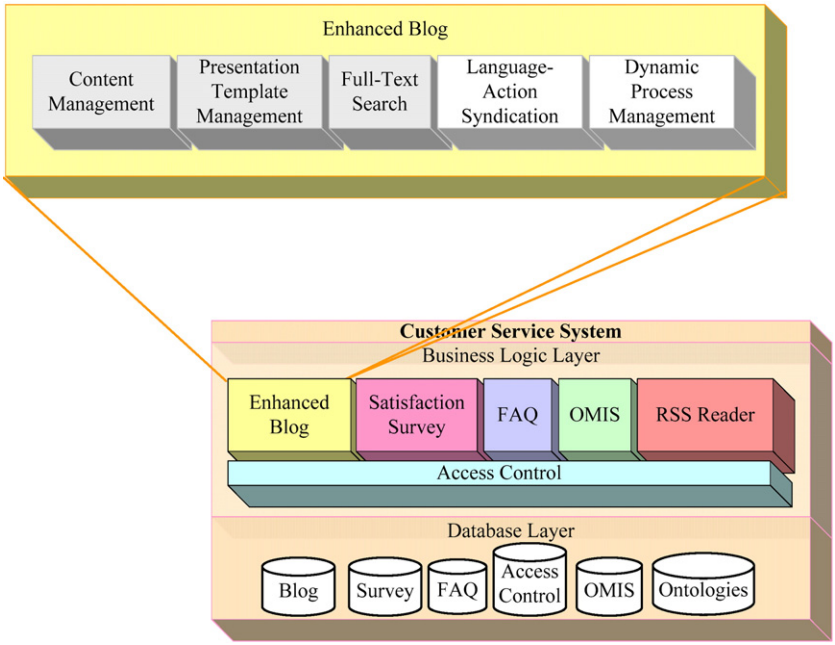

Fig. 2. Proposed customer service system architecture.

- *FAQ System*: Explicit knowledge that answers frequently asked questions can be stored in the *FAQ System*. Employees can use this system to search useful knowledge and apply it to customer services.
- *Organizational Memory Information System*: Employees can use the *OMIS* to acquire, retain, maintain, search, and retrieve organizational memory [17]. Employees can also use the *OMIS* to identify appropriate collaborators [27]. Ontologies exist for representing enterprise metadata. Moreover, when the *enhanced blog*, *Satisfaction Survey System*, and *FAQ System* are updates, the *OMIS* would be notified, which then extracts valuable data for future reference. That is, employees can use the *OMIS* to (1) maintain ontologies, (2) access ontologies to search for useful information from existing personal or organizational knowledge using keywords (e.g., choosing a specific topic of customer opinion to search knowledge and examining a historical series of blog posts or accessing heuristic rules), (3) and monitor when new knowledge is generated and stored into the knowledge base (e.g., when an important customer opinion is raised and its solution is created).
- *Access control system*: Customer data are sensitive. Even for employees, some internal data are confidential and should be safeguarded against access. Hence, the function of access control is essential in a customer service system. The *access control system* provides functions for establishing the authorities of roles and setting security levels for blog posts.

This study suggests deploying *enhanced blogs* to support on-line customer services and organizational collaboration (Fig. 3). Different business units of an enterprise can have their own blogs (e.g., BU1 and BU2) existing outside an enterprise firewall. Business units can publish information they want customers to know on their blogs located outside the firewall. Customers can also post their opinions on an enterprise's blogs and receive responses. Additionally, business units can use such blogs to contact suppliers.

Each employee would manage their own blog located inside the firewall. Employees can use their own employee blogs to deal with customer opinions on enterprise blogs and cooperate with others during customer service processes. Employees can also use employee blogs for collaborative work and various other tasks. Furthermore, employees can write daily work reports on employee blogs. Blogs, as tool for knowledge management, encourage individuals to record and share their experience (and expertise) with others.

3.4. Integral view of the standard

In this section, the actor interaction diagram and *RSS Reader* interface template are described to explain how the three parts of the standard (including the dialogue patterns, the process, and the systems) are integrated.

3.4.1. Actor interaction diagram

This work presents 15 actor interaction diagrams (see Appendix) that describe interactions among actors. In these diagrams, actors are humans (e.g., customers) and systems (e.g., business unit blog). A sequence of dialogue patterns are arranged in advance or can be specified at run time. Actors should follow the dialogue patterns to generate an instance of a dialogue pattern to accomplish a customer service job. Hence, actors can use dialogue patterns to control the progress of a customer service process.

The formal notation of <*S*, *I*, *L*, *T*> describes the semantic messages (blog posts) constituting a dialogue in the diagram, where *S* is the speaker sending a message, *I* is the illocutionary point, which is a message type, *L* is the listener receiving a message, and *T* is what thing is mentioned in a message.

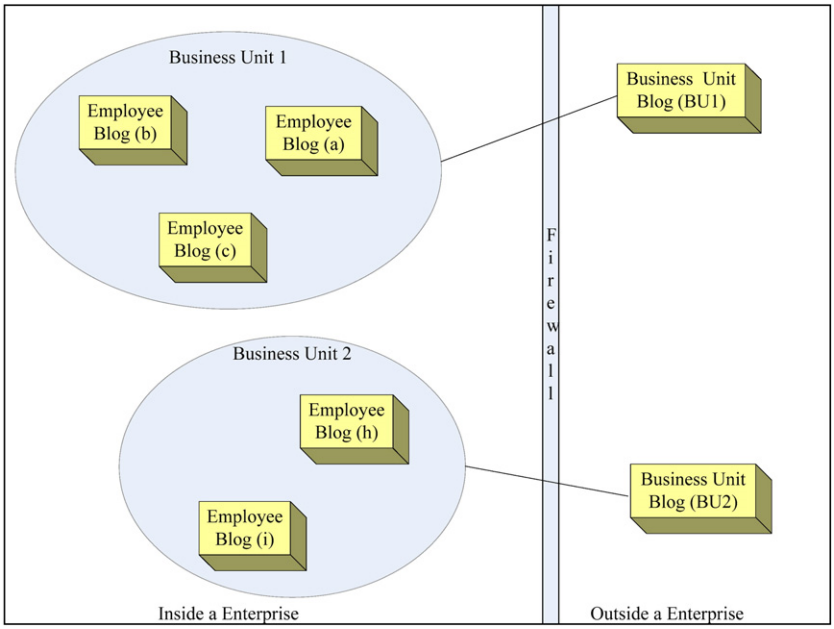

Fig. 3. Deployment of blogs in a business context.

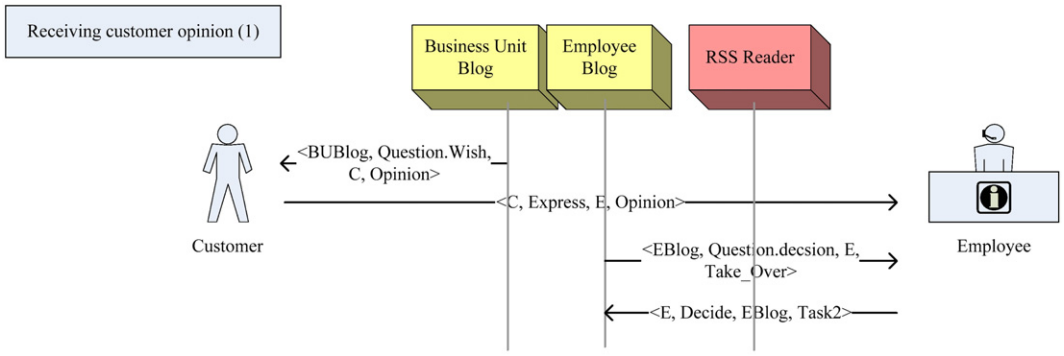

Fig. 4. Actor interaction of receiving customer opinions.

In the first diagram, an actor interaction for the first task in the proposed on-line customer service process is duplicated for illustration (Fig. 4). There are five actors doing receiving customer opinion collaboratively (Fig. 4): *Customer*, *Employee*, *Business Unit Blog*, *Employee Blog*, and *RSS Reader*. Four messages should appear in the actor interaction of this task sequentially. In the first message, the *Business Unit Blog* recommends that the customer post a comment by asking the customer, "Do you have any opinion?" The formal notation of this message is <BUblog, Question.wish, C, Opinion>. The *Customer* can then *express* an opinion; this notation is <C, Express, E, Opinion>. After the customer posts their opinion on the *Business Unit Blog*, the *RSS Reader* generates a new item (in the "to-do list") on the employee's *RSS Reader*. Hence, employees use the *RSS Reader* to read this opinion. After an employee receives the customer's opinion, the *Employee Blog questions* the employee about decision: "Do you want to take over this job and go to the next task?"—the notation is <Eblog, Question.decision, E, Take_Over>. Employees can choose to take on the job. Finally, after the employee clicks the button (implying the semantics: <E, Decide, EBlog, Task2>) to take on the job, the *Employee blog* recognizes that the employee should then complete task 2.

3.4.2. Interface template of the RSS Reader

Fig. 5 presents the interface template of the *RSS Reader*. The top area (area 1) shows the system name (*RSS Reader*) and personal information (e.g., user name). The left area (area 2) shows lists posts in three different ways. In the left area, area 3 lists posts by job (e.g., customer service job or system maintenance job). Area 4 lists posts by listener, and, finally, area 5 lists posts by speaker. The right area (area 6) shows a detailed list of posts or post content. For instance, when choosing a listener in area 4, area 6 will show the listener's "to-do list" and information received.

The *RSS Reader* provides several functions, and employees can use the *RSS Reader* to control customer service through dialogue patterns. These functions support employees to read the following information. (1) status of job progress—clicking on a blog name in area 3 shows each job's status, which is controlled by dialogue patterns in each blog. For instance, when employee P decides to take on the job of customer Dr. Lin's problem within a department? (the semantics are <E, Decide, EBlog, Task6>). The *RSS Reader* receives the semantic message and this job is shown in task 6 in area 6 (Fig. 6). (2) Event history of job—clicking on a job name in area 3 shows the job's historical events generated by dialogue patterns; for example, the collaborative work on the credit card problem is constituted by these dialogue instances made by human actors (Fig. 7). (3) The "to-do list" and received information—clicking on a listener's name in area 4 shows what job the employee has to do or what information the employee has to know. For instance, Roberta can open her *RSS Reader* to browse her "to-do list" and relevant information (Fig. 8).

4. An illustrative scenario

This section presents a hypothetical scenario as an example demonstrating how the new standard works. Assume that an on-line game company, *I*, uses this standard to support customer services. To interact with customers, two game product teams, *Y* and *Z*, place their own business unit blogs for customers outside of the enterprise. Each employee has his/her own employee blog inside the company. To interact with suppliers, three departments (sales, management information systems, and law department) place their own business unit blogs for suppliers outside the enterprise. The suppliers also have business unit blogs for interacting with the game company. Thus, customers can use business unit blogs to receive information about new products

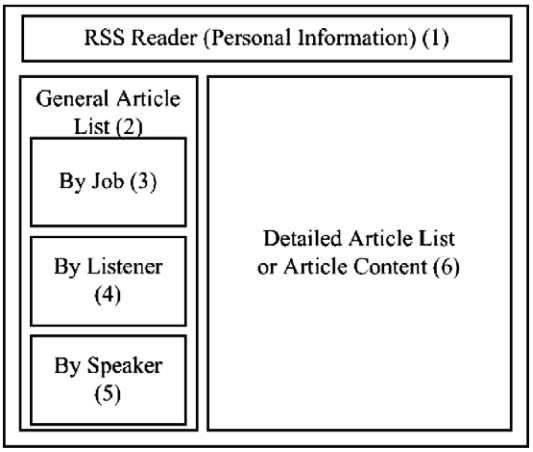

Fig. 5. Interface template of the *RSS Reader*.

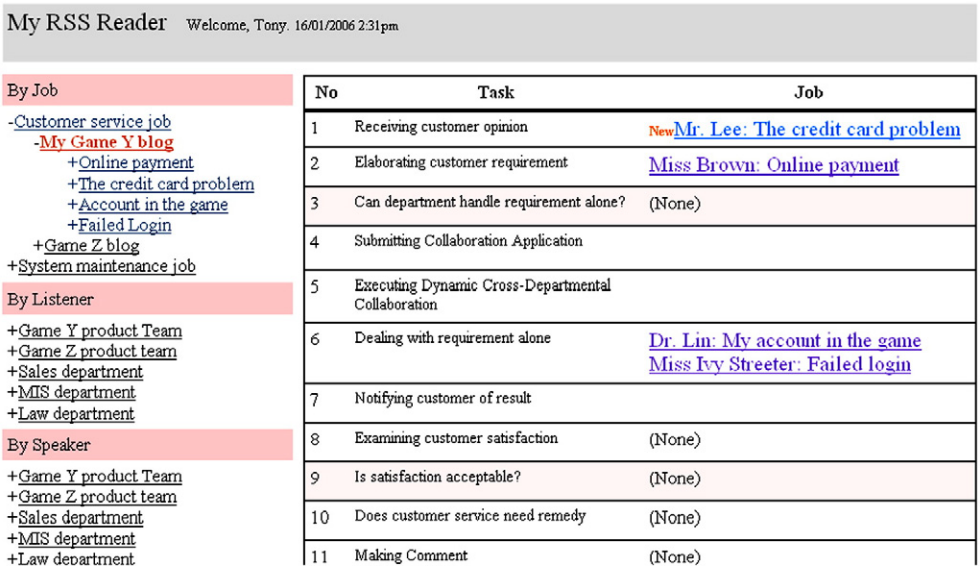

Fig. 6. Customer service job of Game Y Blog on Tony's *RSS Reader*.

and activities as well as interact with enterprises. Company *I* and its suppliers can also use business unit blogs to interact.

Mr. Lee is a customer of the on-line game company *I*. One day, he tries to use his credit card to transfer $50 into his game account. However, during the transaction process, the system on the electronic commerce website displays an error message indicting that his credit card is unacceptable. Mr. Lee's bank assures him that his credit card is valid. Therefore, Mr. Lee posts a message (<*C*, *Express*, *E*, *Opinion*> in task 1) on the game *Y* blog.

Tony, an employee in the game *Y* product team, opens his *RSS Reader* and reads Mr. Lee's opinion. The interface of Tony's *RSS Reader* (Fig. 6) shows that there are four customer service jobs on the game Y blog and the new job associated with Mr. Lee's post is still in task 1. Tony then informs Mr. Lee that the company will solve the problem as soon as possible (<*E*, *Express*, *C*, *Proposed_Requirement*> in task 2). Tony knows he cannot handle this problem alone. He then uses the *OMIS* to search past records and find someone whose responsibility is to keep the on-line payment system working (<E, Question.fact, OMIS, Problem> in task 3). Tony finds Roberta Liu, a system maintenance staff who has experience handling problems associated with the on-line payment system. Tony then decides to collaborate with Roberta, who is outside the product team (<E, Decide, Eblog, Task4> in task 3) and submits the collaboration application to the product team manager (<E, Question.decision, DM, Collab_App> in task 4).

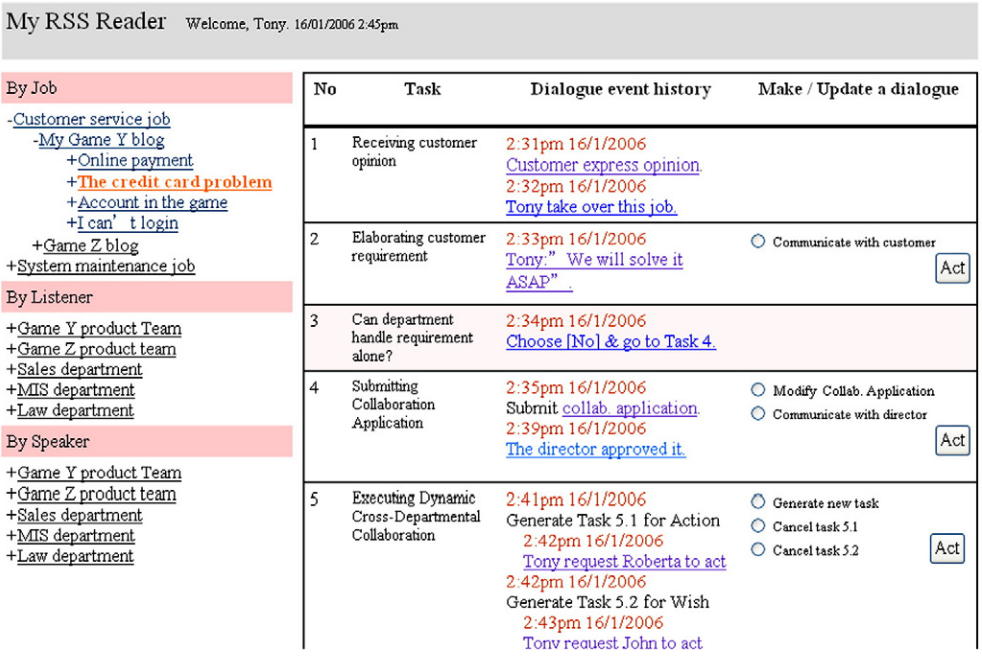

Fig. 7. Mr. Lee's credit card problem on Tony's *RSS Reader*.

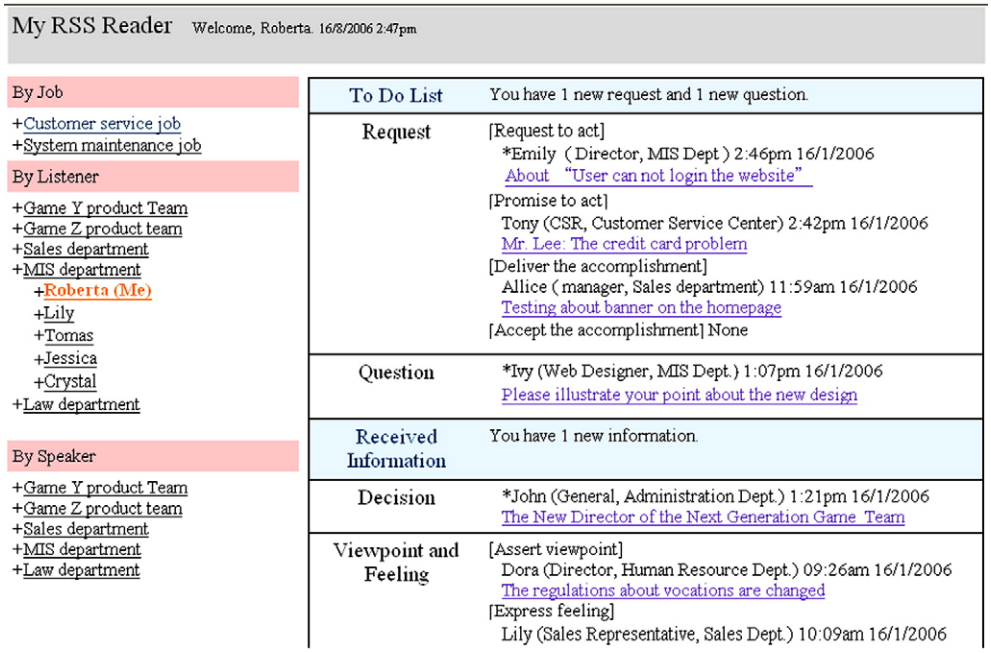

Fig. 8. "To-do List" and received new information on Roberta's *RSS Reader*.

After the manager approves Tony's application, Tony generates a new task (task 5.1) for this action. In this task, Tony requests that Roberta resolve the on-line payment problem (<E, Request, Collab_E, Act> in task 5.1). Additionally, Tony believes that the sales department should be worried about this customer problem. He then generates a new task, task 5.2, which asks the sales department manager how to handle this problem (<E, Question.Wish, Collab_E, Wish> in task 5.2). Fig. 7 shows the interface of the credit card problem on Tony's *RSS Reader*. In the interface, the column for dialogue event history shows the dialogue patterns made by persons during each task.

At this time, Mr. Lee posts a comment, "I am waiting too long to continue playing the on-line game" (<*C*, *Express*, *E*, *Comment_on_proposed_requirement*> in task 2). Therefore, the main customer service process is frozen and is forced to enter the comment intervention management process. Tony receives this comment from Mr. Lee, decides to return to task 2, and offers Mr. Lee a free game card. Mr. Lee can use this game card to play for 5 hours. Tony then can return to task 5 and complete the remainder of the customer service job.

The sales department manager, John, receives this message through his blog reader and informs Tony that they will publish

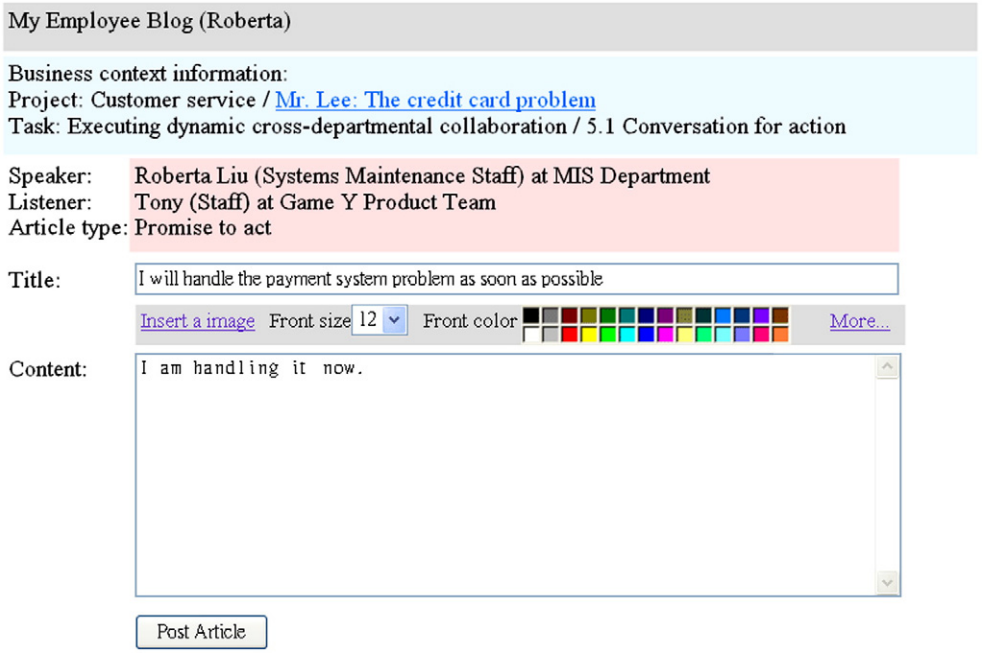

Fig. 9. Roberta posts a message promising to help Tony.

this situation on their website (<Collab_E, Express, E, Wish> in task 5.2). John also generates a new task, task 5.3, and asks Roberta about the situation (<Collab_E, Question.fact, Collab_E, Fact> in task 5.3). Roberta then receives Tony's and John's messages via her blog reader, and promises Tony that she will deal with the problem as soon as possible (<Collab_E, Promise, E, Act> in task 5.1). Fig. 9 shows the interface on which Roberta posts a message promising to fix the payment problem on her own employee blog. Fig. 8 displays Roberta's *RSS Reader*, which shows her "to-do list" and received information. She checks the on-line payment system and ensures that it had a breakdown. Hence, Roberta generates a new task, task 5.4, and posts a message on the business unit blog of the Management Information System (MIS) department to contact the bank's payment gateway services department (<Collab_E, Request, Supplier, Act> in task 5.4).

The department's supervisor at the bank recognizes that their service system stopped for at least 30 min; however, the service is now operational. After Roberta receives this message from the bank's blog, she checks the on-line payment system again and finds that it is working. Roberta then notifies John that the on-line payment system for credit card is working (<Collab_E, Assert, Collab_E, Fact> in task 5.3) and reports this result to Tony (<Collab_E, Deliver, E, Act> in task 5.1). She also informs the vice president of this problem (<E, Question.Wish, Collab_E, Wish> in new task 5.5). Tony then accepts this result (<E, Accept, Collab_E, Act> in task 5.1) and sends it to the customer (<E, Assert, C, Result> in task 7). The customer reads this message on

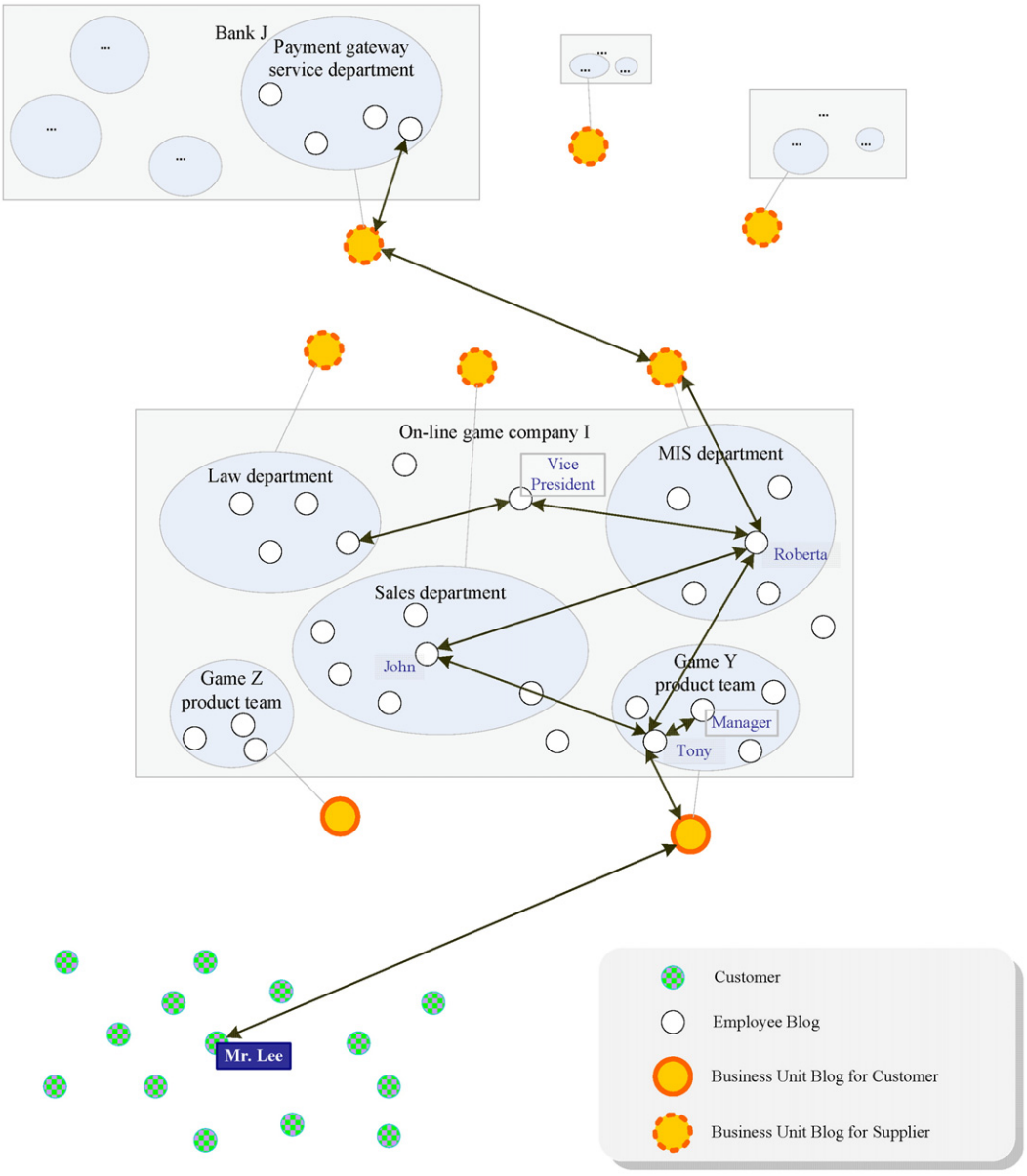

Fig. 10. Conversation flows of the scenario.

the game Y blog. The customer filled out a questionnaire to *express* his good satisfaction with the problem resolution. Thus, the job is complete. Finally, the *OMIS* records how Tony handled an on-line payment system breakdown successfully.

The vice president reads the report from Tony and determines that this bank has the responsibility to cover the cost associated with this problem. Therefore, the vice president extends the above customer service job to ask for the law department's opinion (<E, Question.Wish, Collab_E, Wish>. Fig. 10 presents this scenario.

5. Discussion

5.1. Advantages of the proposed customer service system

The proposed customer service system has several benefits for on-line customer services. (1) Reducing misunderstandings: The comment intervention management process in the *dynamic process management module* helps employees manage customer or employee comments. The *Satisfaction survey system* notifies managers to remedy the faulty when a customer service job has been completed. (2) Supporting various questions: The *access control system* helps employees manage sensitive data and thereby avoid information leaks. This sensitive information can then be posted on blogs safely. The *FAQ System* and *OMIS* help employees reuse existing knowledge when fulfilling various customer requirements. (3) Managing dynamic process: The *LAS* can help employees to syndicate a sequence of language-action messages that constitute a customer service process. The *dynamic process management module* also helps employees manage customer service contexts of blog articles (e.g., a post belongs to a specific task). (4) Overcoming departmental barriers: The *RSS Reader* assists employees and mangers receive cross-departmental collaboration messages correctly and rapidly. Messages on external or internal blogs can be linked together. Table 3 presents a summary of these benefits.

In brief, the proposed standard, including dialogue patterns, customer service processes, and systems, can leverage blog characteristics to help enterprises overcome difficulties associated with on-line customer service. Hence, the standard can assist enterprises in reducing error and avoiding delays in on-line customer service processes.

Furthermore, *enhanced blogs* and enhanced *RSS Readers* support customer services and various collaborative tasks. To enhance collaboration, each employee can use his or her employee blog and *RSS Reader* during various collaborations. Furthermore, to improve knowledge management, employees can use their blogs to post daily work. Thus blog can facilitate knowledge storage, searching, sharing, and reuse in enterprises.

5.2. Managerial implications

This proposed standard has several benefits for enterprises.

(1) Management and controls: The proposed standard has two methods of managing and controlling on-line customer services. (a) Top–down management: Managers use the *RSS Reader* to manage customer service processes. (b) Peer review: Employees use the *enhanced blog* to trace messages and actions during a customer service job. They may comment on whether these messages and actions are appropriate and intervene during jobs.
(2) Supporting effective collaboration: In this proposed standard, the template for customer service processes (Fig. 1) is constructed in the *enhanced blog*. Although process instances are generated based on the process template, the process instances are not only structured but also dynamic in reality. A dynamic process instance allows an employee to decide to move to the next task or return to a previous task based on the process template. An employee can also use the *enhanced blog* to generate a new task at the run-time. This design conforms to practical business requirements.
(3) Tacit and explicit knowledge reuse: Useful explicit knowledge and tacit knowledge of customer service processes can be found on *enhanced blogs*. Employee knowledge or abilities may not be recorded in the *Organizational Memory Information System*, but can be recorded on employee blogs.
(4) Organizational learning: The built-in domain know-how of customer service processes on *enhanced blogs* facilitates organizational learning. These *enhanced blogs* help new employees learn their jobs and help all employees learn new jobs when customer service processes change. Employees can also locate appropriate collaborators based on the personal information posted on *enhanced blogs* and the *OMIS*. The *enhanced blogs* facilitate cross-functional communications and learning, and enrich employee worldview. Furthermore, enterprises can receive useful customer opinions and learn from these opinions. For instance, when several opinions identify the same problem with a product, production departments can alter manufacturing procedures based on these opinions.

Table 3
Advantages of the proposed customer service system

Sub-systems	Misunderstanding	Customer question diversification	Dynamic process	Departmental barrier
Enhanced blog	Dynamic process management module (comment intervention management process)	Access-controlled self-presentation, access-controlled full-text search, multimedia	Language-action syndication (TrackBack, RSS), dynamic process management module	Access-controlled self-presentation, RSS Reader
Other necessary sub-systems	Satisfaction survey system	FAQ System, organization memory information system		

(5) Avoid message overload: The *enhanced blog* assigns a specific listener to each message. A listener can use his/her own *RSS Reader* to receive messages sent to him/her. Moreover, messages are syndicated according to process instances. Hence, a flood of information can be managed effectively.

6. Conclusion

Blogs are an effective tool for customer service and personal knowledge management. This study integrates language-action into blogs to control the dynamic on-line customer service process. The proposed standard helps enterprises eliminate delays and reduce errors in customer services, facilitates organizational knowledge management, and supports various collaborative tasks in the business context.

This study has two important theoretical contributions to current literature. (1) This study proposes a new standard that supports dynamic process. This study proposes a feasible method for managing dynamic process. This study integrates language-action into blogs and applies syndication power to blogs to support dynamic processes that are common in enterprises. (2) This study develops new dialogue patterns for collaboration. In the collaborative era, this study develops new and complete dialogue patterns (Table 2). These new dialogue patterns are a good foundation supporting the dynamic collaborative process in the business context.

Designing an intelligent recommendation system to support dynamic collaboration is an important task for future research. An intelligent recommendation system can provide useful suggestions to employees at the appropriate time. For instance, if an intelligent system understands a customer's requirement, the intelligent system can recommend that relevant employees communicate with that customer and complete additional tasks. Furthermore, applying *enhanced blog* to other domains is also an important task for future research. Many collaborative tasks, such as system development, can use *enhanced blogs* to support teamwork.

Appendix A. Actor interaction diagrams of customer service tasks

Main customer service process

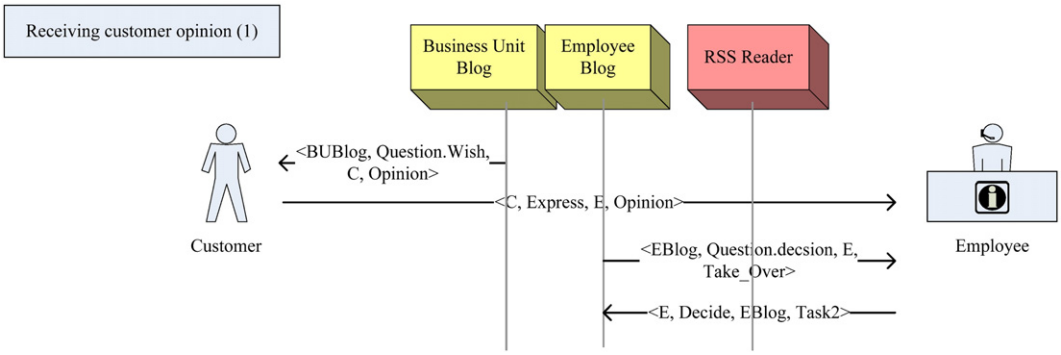

Fig. 11. Task 1: Receiving customer opinions.

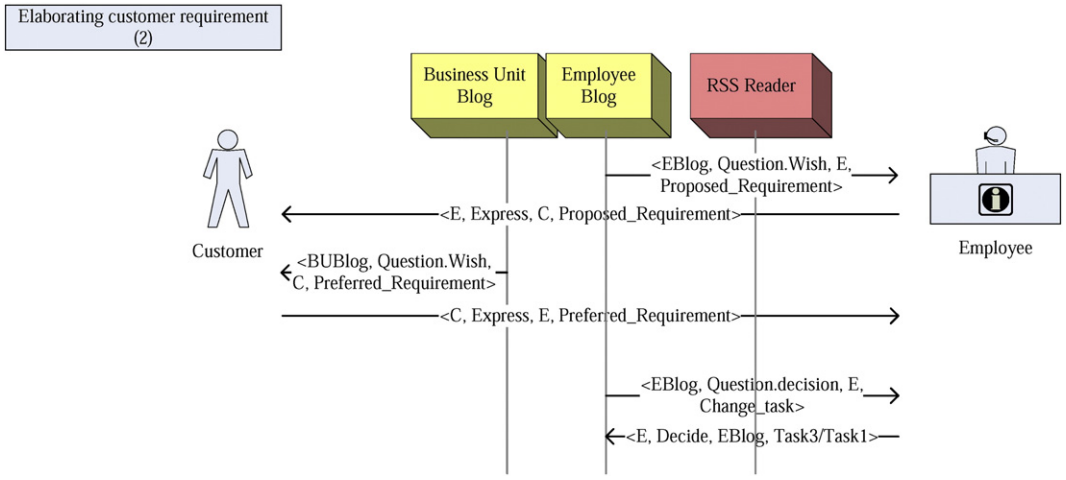

Fig. 12. Task 2: Elaborating customer requirements.

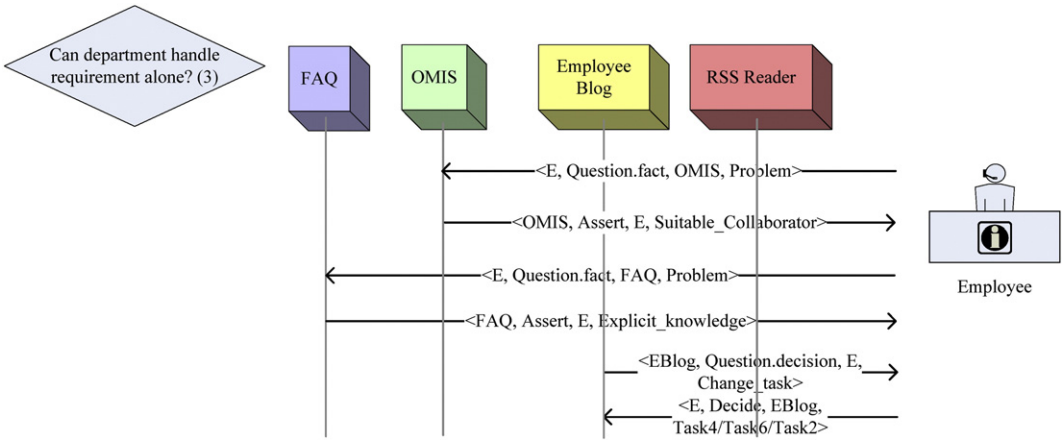

Fig. 13. Task 3: Determining whether cross-departmental collaboration is required.

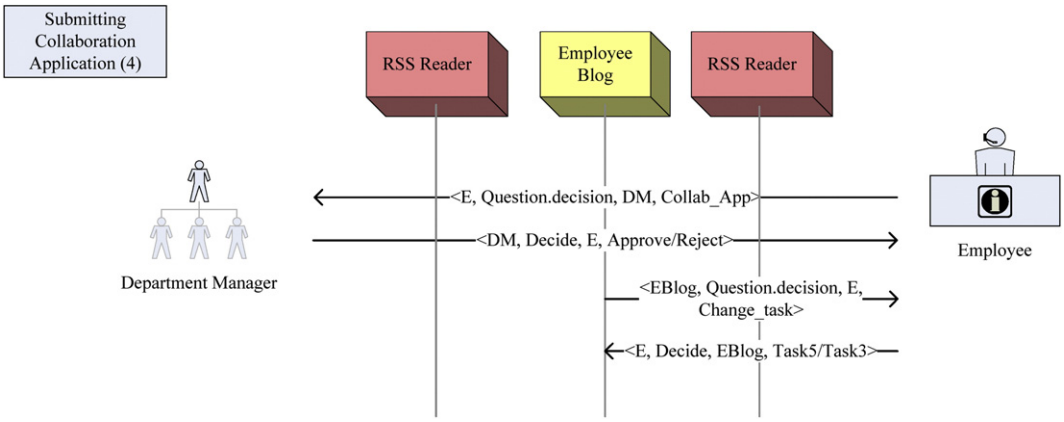

Fig. 14. Task 4: Submitting a collaboration application.

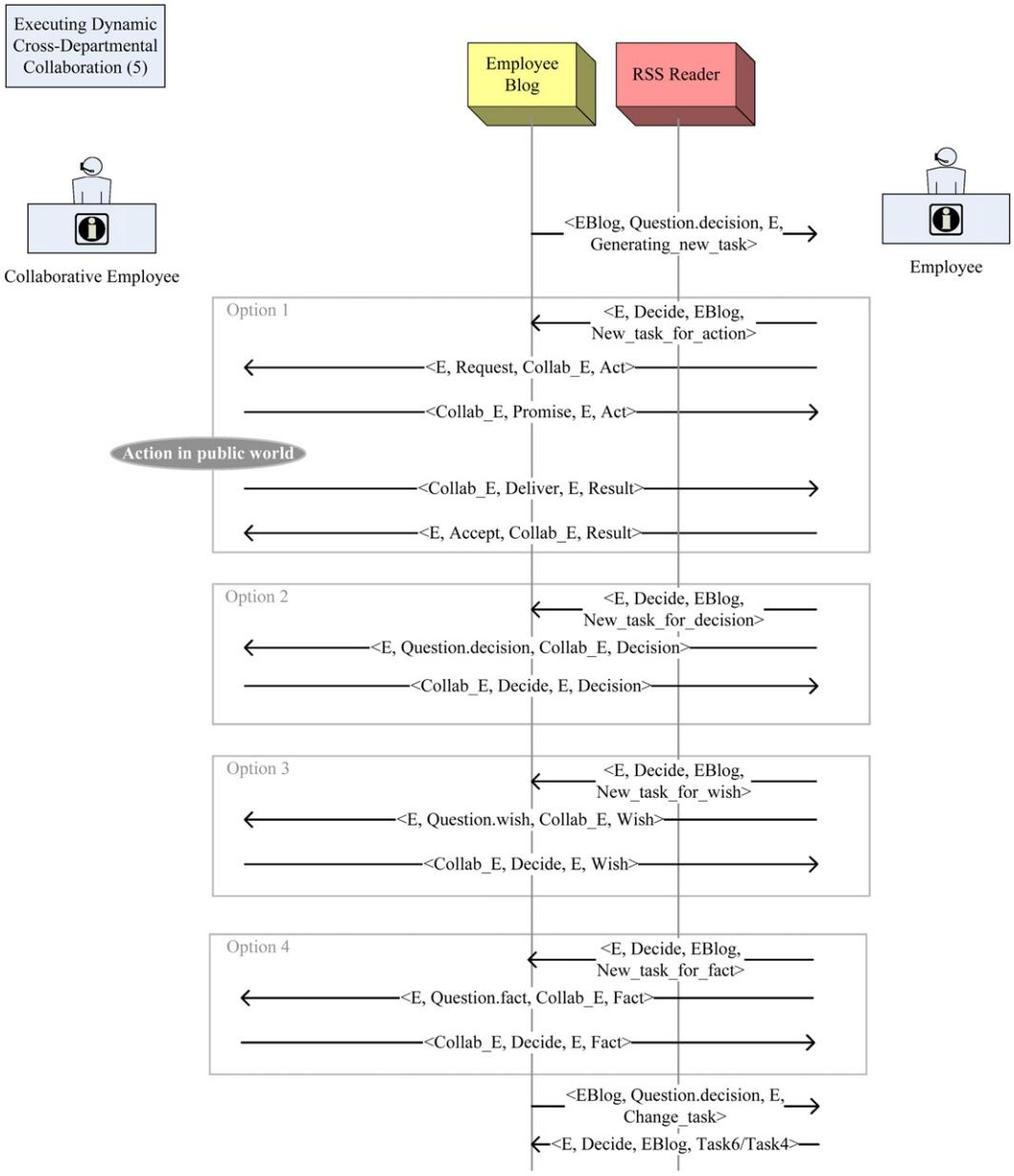

Fig. 15. Task 5: Executing dynamic cross-departmental collaboration.

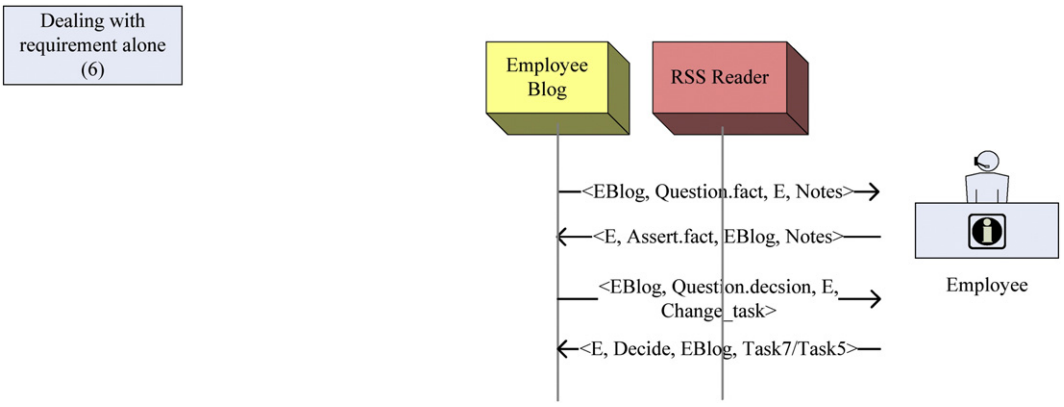

Fig. 16. Task 6: Dealing with a requirement alone.

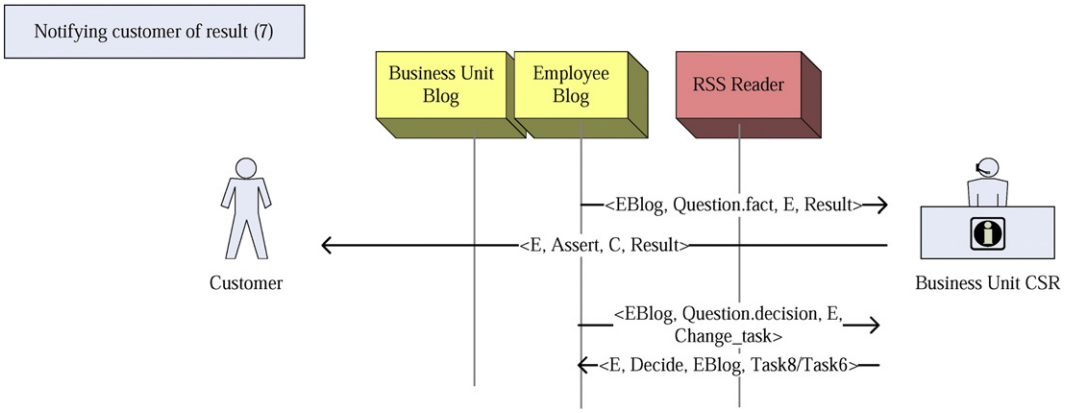

Fig. 17. Task 7: Notifying customers of a result.

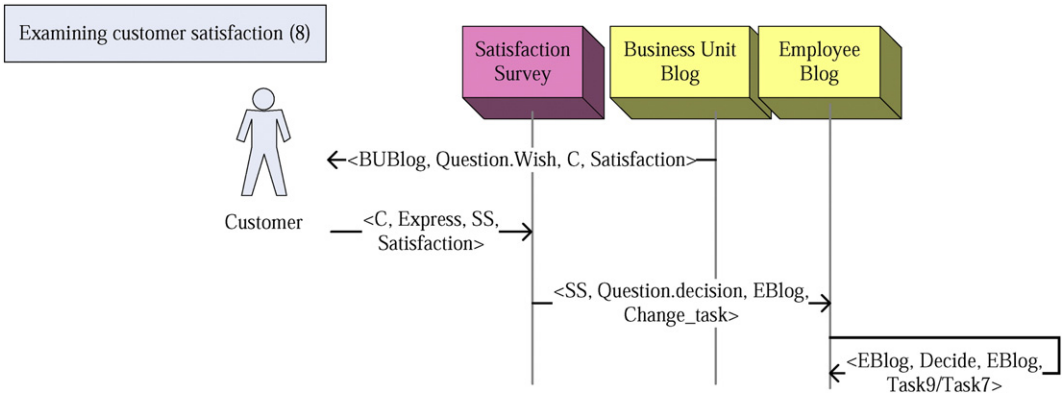

Fig. 18. Task 8: Assessing customer satisfaction.

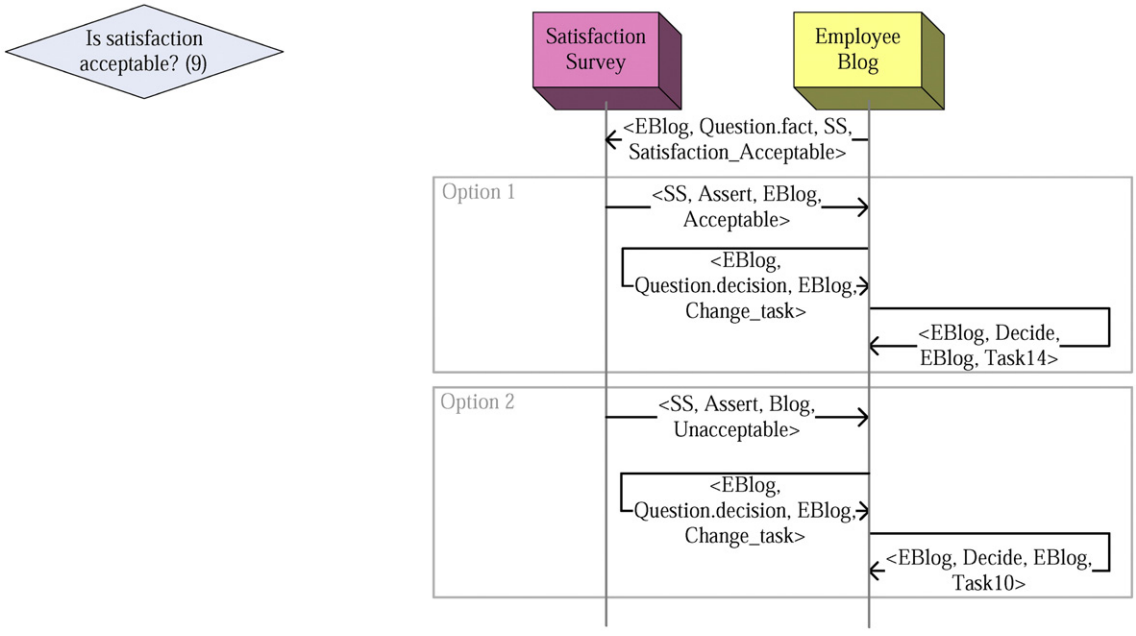

Fig. 19. Task 9: Determining whether satisfaction is acceptable.

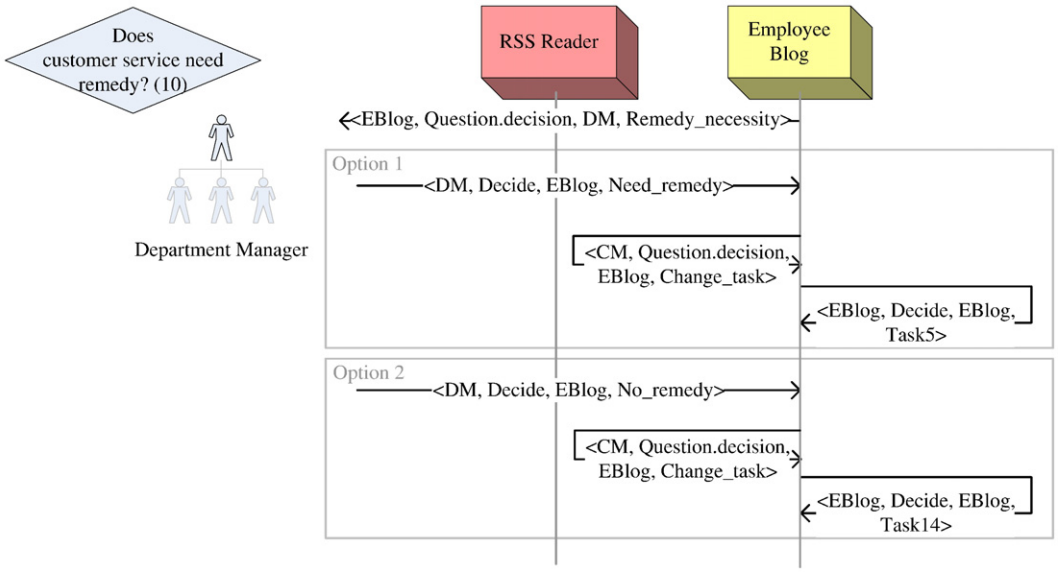

Fig. 20. Task 10: Determining whether customer service needs to be remedied.

Main customer service process

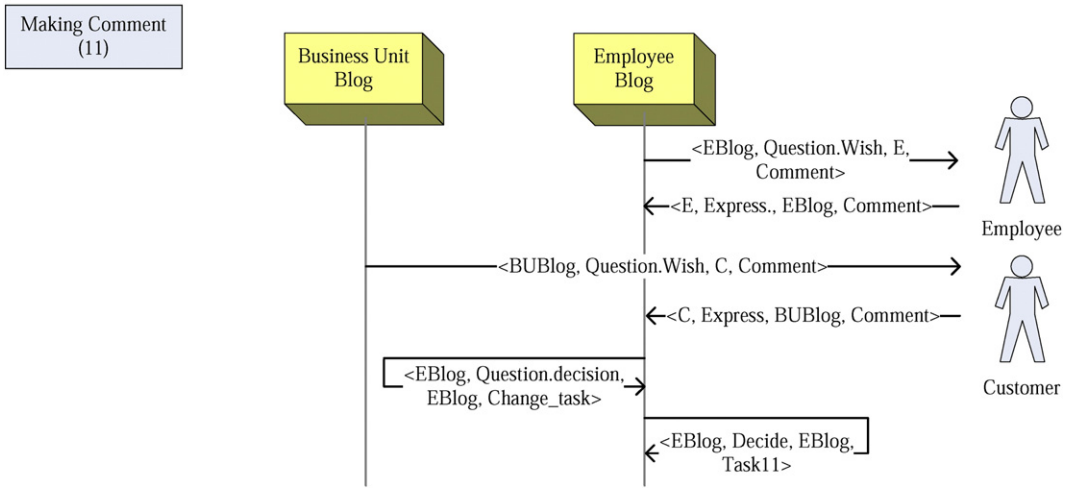

Fig. 21. Task 11: Posting comments.

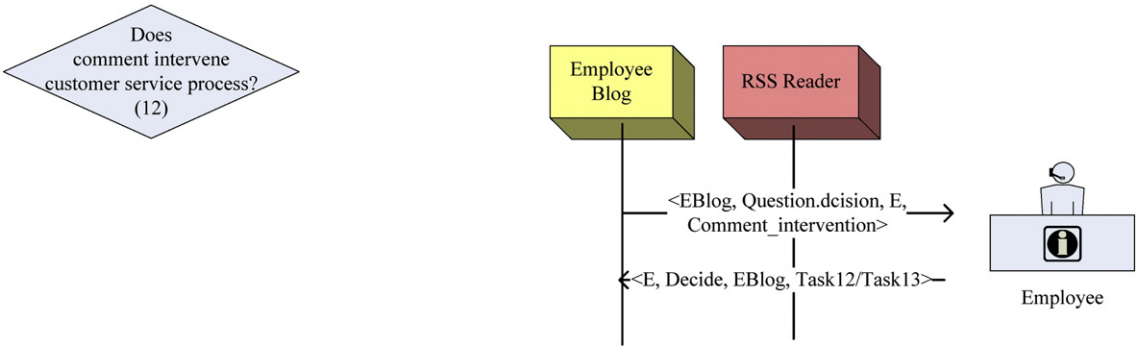

Fig. 22. Task 12: Determining whether a comment intervene a process.

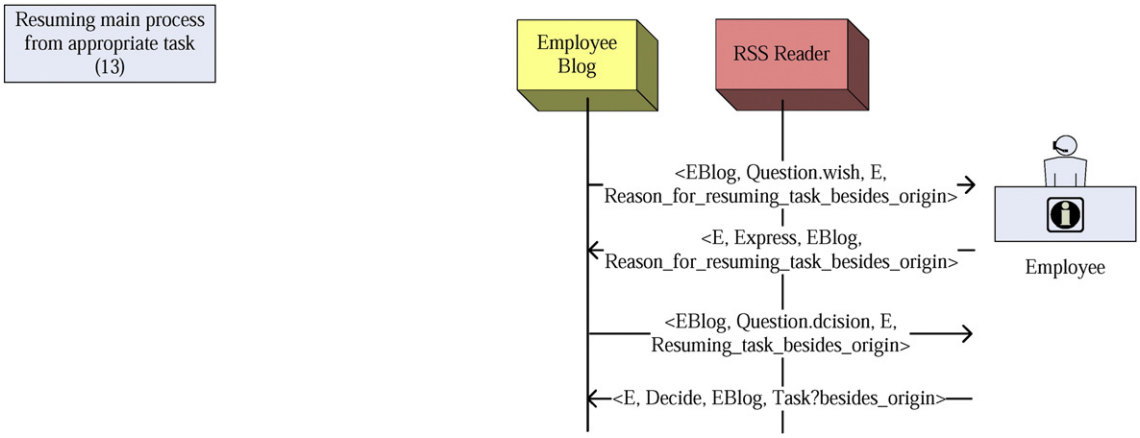

Fig. 23. Task 13: Resuming the main process of an appropriate task.

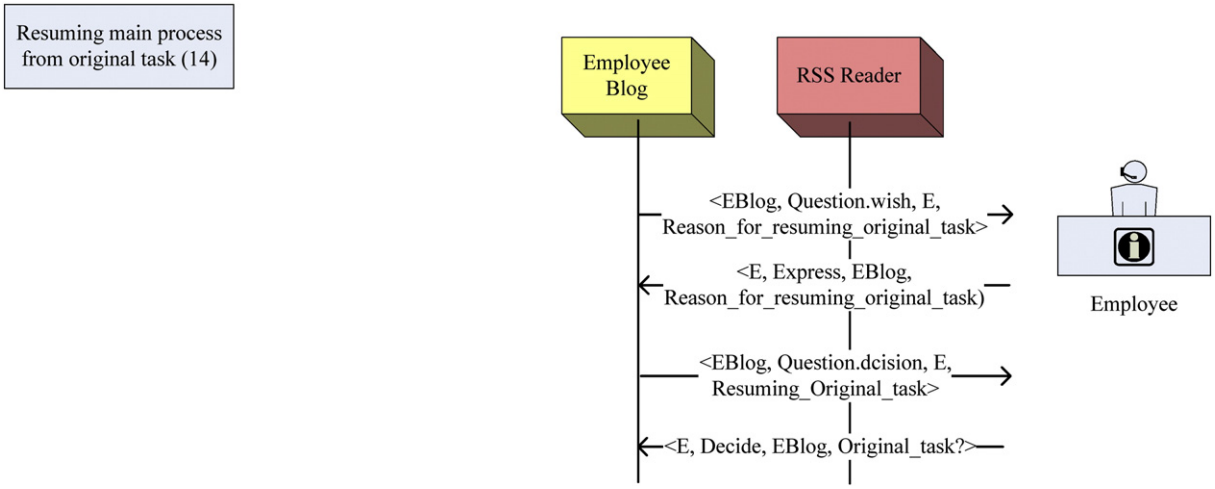

Fig. 24. Task 14: Resuming the main process of an original task.

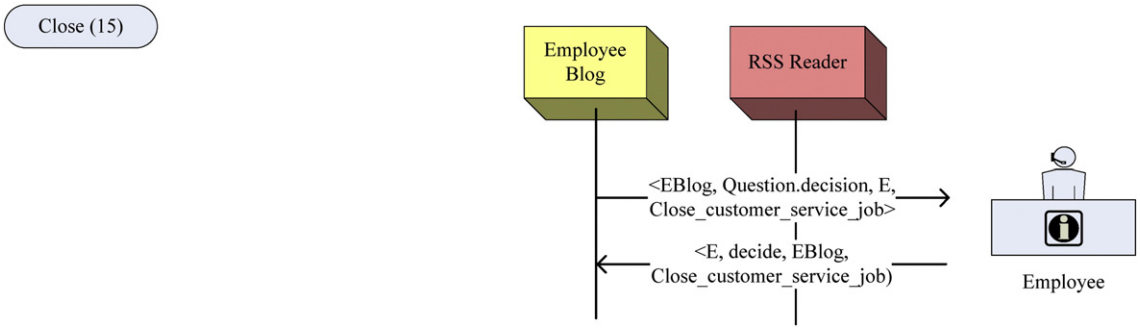

Fig. 25. Task 15: Closing a customer service job.

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Heng-Li Yang is a professor in the Department of Management Information Systems at National Chengchi University in Taiwan. He was the former chairman of the Department. Currently, he is the director of the computer center of the University. His research interests include data and knowledge engineering, software engineering, knowledge management, information management in organizations, technology impacts on organizations, and empirical studies in MIS. His papers appeared on Information & Management, Expert Systems with Applications, Information Processing and Management, Data and Knowledge Engineering, Cybernetics and Systems, Online Information Review, Industrial Management & Data Systems, CyberPsychology & Behavior, etc.

Chi-Lun Liu received his MBA degree in Information Management from Fu Jen Catholic University, Taipei County, Taiwan. Now he is a Ph.D. candidate in the Department of Management Information Systems at National Chengchi University, Taipei, Taiwan. His current research interests include collaboration systems, software engineering, computational intelligence, and e-learning.