Designing Interaction Channels for Services

A Framework for Understanding and Modeling Communication Needs in Designing a Service

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Abstract:

Service is an intangible artifact. While manufacturing industry provides functionality through physical products they produce, what service industry provides through their services is experience and processes. How providers and users of a service interact with one another is a key to achieve a high quality service experience. During the service, a user needs to actively engage in the interaction with a service provider. A provider of a service needs to keep adapting their service contents in response to the user's changing needs and emerging contexts, while exploring new demands and improving them. This paper proposes the notion of *interaction channels* as a foundation for designing services. Our approach is to look at *features of interaction channels*, which are connected to elements of the technical, emotional, and social aspects of communication in services. This paper presents a list of features of interaction channels that have been demonstrated in communication support tools and mechanisms we have developed over the last several years. Such features would constitute a framework for understanding and modeling communication needs in designing services.

Keywords: *Interaction Channels, Communication Needs, Social Factors, Emotional Factors, Interaction Design*

1   INTRODUCTION

How providers and users of a service interact with one another is a key to achieve a high quality service experience. This paper proposes the notion of *interaction channels* as a foundation for designing services, and presents tools and mechanisms to demonstrate essential features of interaction channels for services.

Service is an intangible artifact. While manufacturing industry provides functionality through physical products they produce, what service industry provides through their services is experience and processes. The provider-user relation of a service is quintessentially different from that of a physical product. Figure1 illustrates the difference.

The relationship between a provider and a user of a physical product is characterized with a point in time, at the time when the product is handed over to the user. The user takes the product from the provider as a one-shot affair. In contrast, the relationship between a provider and a user of a service is characterized with a temporal line, potentially lasting over a long period of time. During the service, a user needs to actively engage in the interaction with a service provider. A provider of a service needs to keep adapting their service contents in response to the user's changing needs and emerging contexts, while exploring new demands and improving them.

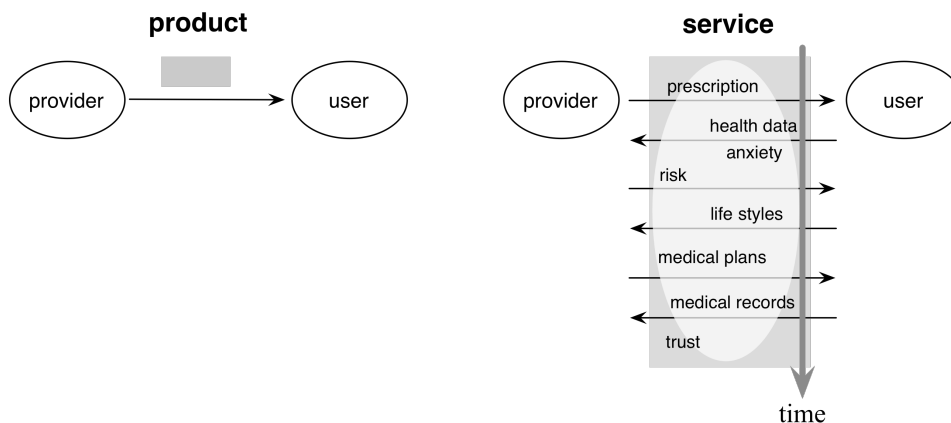[1] Further author information: (Send correspondence to kumiyo@sra.co.jp)

Figure 1 Service-Product Difference in Relationships between Provider and User

The time-scale of such interaction significantly varies depending on the type of services. For instance, in providing an emergency medical care service, a patient and his or her family need to intensely interact with doctors and paramedics in the matter of seconds and minutes. Museums, in contrast, provide services to visitors intermittently, but may last for a number of months and years.

With a product, a user stays as a passive consumer of the product. With a service, the user needs to be an active participant in order to obtain high quality service experience.

Interaction channels we propose depict the fundamental nature of an interaction that constitutes a service. It is not about communication channels, such as which media to use (i.e., email, WIKI, or face-to-face), how much bandwidth the channel should have, or how dependable the channel is. In contrast, it is about designing how users and providers of a service interact with each other, by sharing, revealing, hiding, recording, or deleting one's own activities and information via using the service.

2. INTERACTION CHANNELS FOR SERVICES

Depending on the type and the nature of a service, each stakeholder should be able to select and control his or her interaction styles by deciding which interaction channel to use. By interaction styles, we mean the modes of interaction, which include:

- which part of their information in what order they want to or not want to give to the other stakeholders in what timing,

- what information of others they want to know, or not want to know in what contexts,

- how much interaction histories they want to record, or not want to record, and

- with whom they want to share, or not share such recorded information.

For instance, in consulting a medical doctor, we may prefer face-to-face conversation. In asking a lawyer for suggestions for a possibility of lawsuit, we may first prefer not revealing our own identity. Elementary school students may write to an artist when they visit an art museum, and their letters may later be exhibited with the art works. Thus, different types of services require different interaction modes for the stakeholders.

The goal of our research is to design innovative interaction channels to nurture communication that constitutes a service under consideration. Nurturing communication in a service is not about increasing the amount of communication but about increasing the quality of the communication experience in the context of the service[9]. Designing interaction channels does not mean to decide whether the service should use video-chat, twitter, or Wiki. Such widely used existing communication technologies are mostly built for general purposes in particular styles. Computer technologies can afford much wider varieties of interaction styles. A subtle difference in interaction design may result in a huge difference in people's perception of the way they interact with services.

Designing interaction channels need to take into account the following three aspects: (1) technical aspects (such as modality, temporality, persistency, security, disseminability, serchability, visualizability), (2) emotional aspects (such as uneasiness, restlessness, happiness, joy, satisfaction), and (3) social aspects (such as sharing, understanding, trusting, believing, forgetting). The three aspects are related to one another, but are not directly associated with one another.

Our approach is to look at *features of interaction channels*, which are connected to elements of different aspects (Figure 2). The following section presents a list of features of interaction channels that have been demonstrated in communication support tools and mechanisms we have developed over the last several years. We believe such features would constitute a framework for understanding and modeling communication needs in designing services.
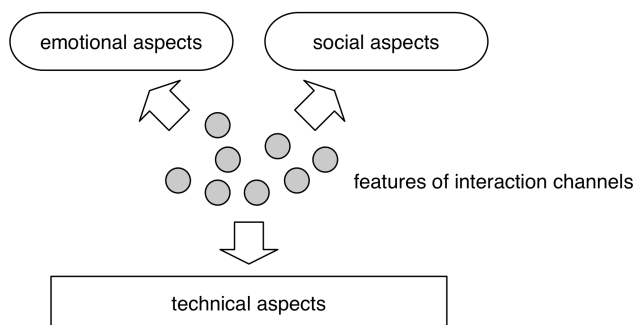

Figure 2 Features of Interaction Channels and the Three Design Aspects of an Interaction Channel

3. FEATURES OF INTERACTION CHANNELS

We have developed a number of communication tools and environments in the context of supporting creative knowledge work, collective creativity, organizational information sharing, and software development. This paper uses the systems as a way to exemplify features of interaction channels that we think fundamental to services.

3.1 Names, Identity and Anonymity

Whether a service user should be able to stay anonymous often becomes an issue in designing a communication mechanism. Using a real name or a handle name is often discussed in the context of privacy, security, and identity. Names, however, may play a much more powerful role than those issues. CosplayChat system illustrates this aspect[15].

People may use different handle names to represent opinions from different perspectives in online social environments. CosplayChat allows users to deal with multiple handle names in a single chat session in two ways. The first is to post message in different handle names, and the second is to make another participant to post at least a message by using an imposed handle name. Using the latter functionality makes other participants to think and express ideas and opinions from a requested viewpoint, which is implied by an imposed handle name.

3.2 Recording Communication

Some existing services record verbal communication over telephone for the purpose of security and improving services. We sometimes wish we had recorded the interesting conversation we just had. However, people in general feel uneasy when their conversations are constantly recorded, for instance, during a meeting.

Attractiblog[2] and Bolelog[3] provide a mechanism to invoke off-line conversation by using intra-net blog messages, and then to feed in off-line conversation back into the blogs. Each member of the office wears an RFID tag, which allows the system to identify who are currently sitting at a coffee table. The system uses the information to retrieve blog messages written by those who are currently at the table, and then keeps displaying a randomly selected one of the retrieved blog messages on a large LCD monitor located by the coffee table for the duration of 30 seconds. People may thus naturally start conversation based on the blogged message displayed on the monitor.

The conversations carried out at the coffee table are constantly videotaped, while the recorded video is discarded every thirty seconds when the displayed blog messages is replaced on the LCD monitor. However,

when one of the participants "double-taps" any part of the coffee table (which is equipped with sensors), it makes the system keep the currently displayed blog message on the LCD display and keeps recording the conversation until someone double-taps the coffee table again. When the conversation is over, the videotaped session may be stored in the intra-blog system as a video-response to the then-displayed blog entry.

3.3 Beyond Face-to-Face Talking

Most of existing CMC (computer-mediated-communication) technologies have aimed at helping people communicate face-to-face even if they are remotely located, temporarily apart, or using different languages. Face-to-face talking is often regarded as the most natural and easiest means of communication. However, talking is limited to the form that is temporarily sequential and single-threaded, obeying the turn-taking rule. ChaTEL[10] tries to eliminate some of such restrictions from the verbal form of communication.

Similar to threaded text chat communication, ChaTEL records voice data and displays a list of recorded voice utterances in a sequential order together with the utterer information. A user can listen to each recorded utterances by selecting it, and may verbally reply either to the utterance or the utterer. User studies of ChaTEL showed that the number of threads and the maximum number of concurrent threads are larger than those of a simple voice communication system.

3.4 Communicating through Objects

Communication mechanisms for a service seem to often presume person-to-person communication. A user may just communicate with an object or an artifact without recognizing the person who actually provides information through the object or the artifact.

STeP_IN_Java[12] is a tool that supports Java programmers to look for information relevant to the task at hand. STeP_IN_Java first allows a user to search for documents and program examples about a Java object. When the user needs more information about the object, the user posts a question about the object. STeP_IN_Java then identifies those programmers who have previously used the Java object, selects a few among them based on who have social history communicating with information-seeking user, and forwards the posted question.

3.5 Time that Flows Differently

A number of existing systems use the history of user activities to fine-tune their services. Such activity data are generally time-stamped and all data are treated chronologically equal. For instance, a user may be able to delete all the data older than a particular date and time regardless of how important some data were (and others were not).

The ancient Greeks had two words for time, chronos and kairos. While the former refers to sequential or linear time, which can be measured quantitatively in hours, minutes, and seconds, the latter signifies a time in between, a moment of undetermined period of time in which something special happens. Kairos time is specific to a person and the context, something fleeting, and has a qualitative nature[16]. We may forget an insignificant event within days, but we may not forget significant events over months and years, because they are associated with different kairos time.

The Kairos Chat system[11] allows a user to generate a text message in a different time scale, based on the kairos time, not the chronos time. Kairos Chat has three areas for placing a text message, called lanes. Each lane automatically scrolls with different speed. When a user posts a message to the fastest lane, the posted message scrolls from the bottom toward the top of the lane in the matter of a minute or two, and vanishes. When posted to the slowest lane, the posted message scrolls very slowly, and stays visible for quite a long time. Thus, the number of people who become aware of the posted message (and thereby may reply to it) in the slowest lane is much larger than that of those who become aware of the posted message in the fastest lane. The subsequent version of the Kairos Chat, Collective Kairos, allows readers of a message to change its lane to a slower lane[8].

3.6 Non-Textual Communication

Studies have started to look at the role and importance of non-verbal communication (such as gestures, postures and gaze) in verbal communication[5]. Similarly, textual communication may be amplified by sharing non-textual communication.

PAdd Mail[6] is a mail client system that attaches the editing process information to the mail message in order to share unarticulated information between the sender and the receiver of the message. PAdd mail collects the keystroke information during the process of editing a message, and calculates the time spent on editing per a character, the average speed of keystrokes during the edit, and the ratio of delete-keystrokes to the total keystrokes. The three measures imply how much time and the effort the sender spent on composing a message

4

independent of the length of the message. Each of the three measures are color-coded and attached as three thumbnail images to the original email message.

3.7 Collective Cost of Attention

Communication requires engagement from both the sender and the receiver, and is associated with some cost. This cost becomes not negligible when communication is used as a way to achieve on-demand knowledge transfer within an organization because those who ask and those who answer are equally knowledge workers, and are not specialized ones like help desks. Seeking for information and asking a question requires cost in deciding to whom (or to which mailing list) to ask, in composing a message, and in understanding replies. Answering to a question requires cost in stopping what he or she is currently doing, in preparing for an answer, in composing an answer, and in resuming the original task. Even not answering requires some cost by feeling a little social violation not helping peers. The larger the number of the recipients of a question, the larger the chance the information seeker receives an answer. However, involving a large number of people in a single question-answering session within an organization involves quite a large amount of collective attention cost[14].

DynC (Dynamic Community)[13] is an ephemeral mailing list that is created for information seeking user in an organization. The system uses social and technical profile of each member to identify a few potential information providers based on the topic sought by the information seeker. An ephemeral mailing list is generated for the identified members, and the question is posted to this ephemeral mailing list with the information of who is seeking for this information. The identity of each member is not revealed unless someone answers to the question, thereby, relieving the members of feeling bad if not answering. When the information seeker is satisfied with the provided answer, the DynC is resolved and only the exchanged information is archived for future references.

3.8 Tagging First

Most of communication support approaches try to tag the information pieces that have been generated through the communication. Some communication mechanisms take the other direction, where tags are created first and then people are guided and persuaded[4] to provide information for the tags.

A user of HuNeAs (Human Network Activating System)7 first registers the information topic that he or see is seeking for to the HuNeAs server. Each user wears an RFID tag and when the user seats himself or herself in a coffee lounge, his or her pre-registered inquiry is displayed in one of large LCD displays located alongside the walls of the lounge. Other members who entered the lounge become aware of the inquiry, and may start conversation with the original user if they have some information to share about the inquiry. The long-term operation of HuNeAs helps identify the original user as an expert on the topic since he or she would have probably collected information on the inquired topic over time through conversations.

4. CONCLUDING REMARKS

Although the paper primarily focuses on the interaction between a service provider and a user, there are four types of roles to consider in designing interactions for a service.

- Service Providers (P): e.g., doctors, nurses, paramedics

- Service Consumers and Users (C): e.g., a hospital patient, hotel guest, one seeking for a new house, a museum visitor

- Related Party (R): e.g., family, close friends, company peers (who cares about the consumer)

- External Observers (O): e.g., one who happened to be in the lobby of the hotel the guest is checking in

Designing service needs to take into account how to design interaction channels among the four roles. When thinking about designing communication mechanisms for a service, it often focuses only on the P-C interaction. We think that not only P and C, but also R and O need to be taken into account when designing interaction. To take the medical consultation case for instance, the P-C interaction represents how a patient explains the situation to a doctor, and the doctor explains a medical plan to the patient. The C-C interaction represents how patients share information, experience and their own emotion and anxiety through a patient network. The doctor may consult with another doctor for medication planning (P-P interaction). The C-R interaction represents how the patient's family member looks for information in the Internet and tells the patient about it. The P-R interaction represents when a doctor needs to intensively communicate with the patient's family if the patient's lifestyle needs to be significantly altered. The C-O interaction may not occur directly, but takes place for instance, when

one reads a blog written by the patient. The CO interaction may affect the long-term reputation of the doctor and the hospital.

The list of features of interaction channels provided in the previous section is by no means exhaustive. We need to continue identifying such features by examining more of our system building efforts as well as others. Even if the list does not provide the complete coverage, we think that such an evolving list provides a set of vocabulary that one may use in talking about the communication needs in designing service. Our long-term goal is to construct a model that establishes genre of interaction[1], and identifies principles portraying what genre of interaction is suitable for what types of services.

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