Human Centered Network Usage and Future Management

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Abstract: From now on HCI (Human Computer Interaction) has been performing a number of roles to solve the problems occurring in the era of information technology. However, it wasn't able to reach the ideal status of sciences. This, as it is normally seen from other science areas, can be the natural phenomenon, or it is due to scientific or conceptual science of HCI. One of the elements creating its boundary is that until now HCI is supposed to mention about issues between humans and machines, and its realm is also limited within this boundary. Today, human beings are using digital networks while being connected to networks using devices rather than using only devices. Therefore, a subject area of HCI should be able to contain inclusive networks as well. Problems occurring between digital networks and communication networks of actual world or cognitive and increasing emotional obligation followed by congregative integration of services and various network channels not by the concern of communication types of human beings need to be studied as a main task. Therefore, HCI in the future should expand its specific problem areas to networks, and networks should be planned and designed focusing on human-centered elements.

Key words: Digital Network, HCI, User Interface, Human-Centered Network

1. Background and purpose of the research

Communication innovation by digital networks provided convenient environments to users, and it is not possible to imagine our life without digital networks. Digital networks which had brought rapid changes to our life are continuously providing new channels, creating various services, and becoming integrated with its rapidity. With the introduction of ubiquitous era, the future of communication by the innovative networks which is enabling users to become connected to networks anytime anywhere is now beginning. However, networks enabling innovative communication are not always creating conveniences to human beings. If a person uses his or her cellular phone at a movie theater in a loud voice, he or she is eventually bringing inconvenience to other audiences. Also personal information outflow is often mentioned from mass media, computer viruses expanding through network, and computer intrusions were not usually seen when there were no digital networks. Illegally

downloading music or movies and social, mental problems are also recognized as serious side effects of networks. Networks have been providing a number of unimaginable conveniences to us, but it is true that networks still bring a number of new negative issues to our life.

2. Current status of networks

There existed networks whose main role was a communication such as post mails, telegrams, and phones, but with the expansion of digital networks which are mainly based on internet and wireless communication networks are expanded and increase by geometric progression on collecting information and using services beyond the communication function with the 3rd party. In other words, networks are available anytime anywhere, and by utilizing these networks we are communicating with others, transmitting information, accessing to the bank, listening to music, playing games, watching TV, and checking tomorrow's weather. Also networks bring connectedness even when we are confirming friends' online list from instant messaging services, and having conversations with people (MSN or Google talk). Networks are used not only for communicating with others, but also supporting most of activities related to information, and users feel comfortable only with the fact that they are connected to the networks. Furthermore, with the recent introduction of unified communication, tools and routes of all communication methods are becoming integrated.

3. Situations and problems occurring by networks

Network problems are usually found from security issues (personal information outflows, and computer intrusions) and technical difficulties (speed, capacity, stability, connection with other networks). However, those problems are from the viewpoint of considering networks as physical or functional objects, and it needs to define how networks influence human beings and how human beings change with network. Briefly, the problems need to be solved from the interactive viewpoints between human and networks, and followings are each type of problems.

3.1 Collision between networks and communication of actual world

1) There is no consideration to users' circumstances

When digital networks were not introduced, people didn't usually interrupt someone else's conversation, and waited until he or she finished their conversation. And when someone was not emotionally available, it was usual to start the conversation after he or she became stable for having conversation with. In other words, attitudes, methods, and contents of communication were adjusted and corresponded by his or her circumstances. By giving information about the receiver's circumstances and conditions to the sender, the sender was able to set up the plan for attitudes, methods, and contents for having a communication with, and the receiver was protected by shared information (e.g. the receiver is very busy or distressed) with others. However, when using immediate respondent networks such as mobile phones, SMS, messengers, and voice messengers, as the sender is not able to grasp the receiver's situation, the sender tries to communicate focusing on his or her own situation, and this eventually brings troubles to the receiver. In these cases it is better to have "mobile phone manner" confirming the receiver's availability, but from the viewpoint of the receiver, as he or she is mostly receiving the sender's phone calls, it is possible to have conversations with, but still it interrupts the receiver's tasks or communication

in actual situations.

2) Collision between networks and communication of actual world: time gap between actual world and network world

When the receiver is busy with his or her own tasks, and finds out that he or she has received a message from the sender. But the sender is already logged out from an instant messaging service, or the sender is not even able to remember if he or she had sent an email to the receiver after certain duration. These problems are frequently happening in our life while we are using digital networks, but these issues still can be regarded as problems if there still are possibilities for improvement. Generally, we are communicating by the different characteristics of delivering methods or networks. For example, when writing emails, we don't usually write in dialogic style since we are not expecting immediate responses from receivers. However, we usually use appropriate narration when using phones since it is possible to have general conversation with receivers. As messengers are used for immediate responses, we are trying to have normal conversations as well. However, networks with various time respondencies such as phones, SMS, emails, messengers, and personal blogs sometimes break communication or distort the intention in communication.

3.2 A gap between communication model of actual world and network communication model
1) Difference in forms, attitudes, and methods

One of the most important elements in designing user interface is to consider user's mental model. For performing certain tasks, a user need to have task models, and when task models are different from an actual world, it causes errors or chaos. Therefore, if a user's mental model is well considered, it can bring easy and intuitive usability to users as well.

There might be communication models in actual communication behaviors. In other words, when the sender has an intention to have communication with the receiver, he or she is constructing plans for communication in a specific method. When a communication sender comes up with contents to transmit to a receiver, he or she delivers messages after selecting a form, a media, a delivering method, and a communication attitude. For example, when to deliver a message to the receiver to have dinner with, he or she would ask as "would you like to go for dinner?" to elder people or in formal situation or relationship. If a receiver is a friend of a sender, he or she would ask as "let's go for dinner!" Even for this simple communication, the sender is to select the most appropriate form, method(e.g. sending messages by mobile phones, SMS, messengers or etc.), and attitude(e.g. being friendly or formal or etc.) by the different receivers or circumstances.

In general, communication in the era without digital networks had the great importance on sending messages, but its forms and attitudes were also very important. Even though it had similar contents, by its attitudes and forms the sender's personality, knowledge, and social position were differently evaluated.

However, by using digital networks, while attitudes, forms, media and delivering methods on communication became very important variables, media that can be selected for delivering and its methods (whether to send messages by SMS, or mobile phone or email) became wider, and selecting more efficient, accurate, and economic networks and methods became a standard for a good communication skill. The difference on the communication methods can be recognized as "communication without politeness" or "communication without

touches of humanity."

2) Differences in object-oriented elements and media-oriented elements

It is usual to spend most of the time on reading emails even before starting one's own tasks for the day. Sometimes users are confused whether they received messages related to their work either by email or by instant messaging service. When using networks, since selected channels are focusing on situations or efficiencies, users are to use various networks like SMS, email, and voice communication for specific contents. This also happened in the past, but for important works or projects as it used to have a document sending and receiving system, all the histories were arranged in order. Regardless of the media it used for delivering, since it was organized by specific projects, it was easy to grasp the progress of the project, and it was easy to accurately distinguish if that information was formal or informal. However, general emails or mobile phone communications are displaying information by received time or received order.

In other words, communications in the actual world are to organize the information by objectified users or tasks for having communication with, but using network decentralizes information by network media. And the difference can increase a load to users on managing information.

3.3 Network and network services which is numerous and not integrated

When performing certain projects or tasks, we are communicating using various network channels. We use different methods (e.g. mobile phones, instant messaging services, web hard services, and emails) by different situation and objects. One might have more than 5 email accounts, more than 2 mobile phone numbers, and sometimes use more than two web-hard disk services. It is very natural not to memorize how many cyber communities they are registered to, and it is not possible to understand or remember registered network service's types and the total expenditure. Sometimes they need to manage music by different devices like mobile phone/different media players/email accounts, stored phone numbers on a mobile phone, and other information are not effectively shared by the different devices we are using. As network methods, service providers, and service applications are different each other, users need to remember, manage, and integrate the information for using the network.

3.4 Changes on information management patterns

1) From process-oriented element of information to communication-oriented element of information

With the development of digital networks a number of phone calls, emails, messengers, and webs are becoming more frequent in our normal life. Total amount of time on labor might have increased compared to the past, and it is extremely apparent that communications based on networks have extremely increased as well. This, in other words, means that the total amount of time only for managing information is also comparably decreased. When someone is good at working, it means that he or she is not only good at completing the assigned tasks, but also information which is related to the task is accurately and effectively delivered and managed. Briefly, lots of times during the work hours have been invested to only simple delivery and adjustment of information. People are not performing their works by themselves, but mostly completing them by constructing a system with others. Compared to the past, with more developed technologies on networks, more people and information are invested

for completing one task, and the total amount of time for completing personal tasks is decreasing, and pays more amount of time to information management as for a part of a system.

2) Users are not willing to acquire information

Recently one of the apparent phenomena found from users is that they are not trying to acquire and keep information, because information is always available on the web. This phenomenon seems to affect society, and the individual's knowledge is not an important value anymore. These phenomena constantly drops down one's desire on acquiring and keeping information, and networks are possibly able to drop down human's learning ability by weakening desires on appropriately acquiring and keeping information.

3.5 Complex problems or others

There are a few more problems on using the networks such as personal information outflow, financial burden on paying bills on different network services, and network symptoms which are happening when a user goes out without a mobile phone or when internet service is not working. And in reality these problems are occurring in a complex way, as it creates more complicated circumstances.

3.6 Problems not being recognized as problems

One of the most serious problems is that users are not recognizing these issues as problems. We are actually utilizing network society, and not considering these issues as serious problems since we are already accustomed to networks. The reason with this problem is that it was not created at a certain point but it has been gradually created, and it has more comfortable elements and problems, so that the user can not recognize it as a problem. Users are just considering them as inconvenient or annoying situation. However, as networks and its service boundary are expanding, and being requested to be connected from anyplace anytime, problems will become more serious.

4. Concept of HCN

There are needs of developing more human-centered networks, and human-centered network is mutually connected to communication in actual world and information networks, and should strengthen mutually complementing usability or convenience with minimized mutual interruption. It also needs to be designed for a user's information managements and communication features, and indicates services using networks and digital network which are not disturbing or weakening human beings' ability to acquire or manage information using networks. Considering users on this new concept is becoming more apparent from the evolutionary viewpoint of HCI.

1st Period: interaction in the multi-functional era

Interaction to easily learn and use for functions of devices which are becoming more complex.

2nd period: interaction in integrated control on various types of devices

Interaction to synthetically manage devices such as TV, VTR, Air conditioner, audio system, and so on.

3rd Period: interaction in synthetisized era between devices

Interaction to increase conveniences by sharing information between various devices while downloading pictures taken from mobiles phones to computers and transferring by emails

4th Period interface: simultaneous uses of various devices and networks

Interaction to integrate various devices, tools, and networks such as using web from mobile phones, and voice/video communication from messengers

5th Period interface: rearrangement into human-centered network

Interaction considering communication environment beyond simple unification of various devices, tools, and networks.

Currently it is 4th period on interaction era, and there are active trials for connecting or integrating various existing HCI platforms such as web, mobile phones, and computer applications. This can simply play an important role on letting users easily recognize different platforms and functions, but it will not be easy to create convenient environment on using networks. It is because diverse networks and network services are simply gathered in one device, and not providing functions which are synthetically supporting user's communication while organically being integrated each other.

5. Needed roles on HCN

The reasons and problems for needing the concept of human-centered network are stated above, and for designing human-centered network it needs to consider following subjects.

1) Mutual understanding and declaration of circumstances

When users are using digital networks, there needs information whether the receiver is able to correspond to digital networks or not. This information can be partially grasped by automation or inference, or it is possible by declaring one's own situation to others. Users are not grasping how easily they can correspond to digital networks by all means, and users will be more exhausted by the increasing network connections.

2) Compromising the time gap

There needs a time revision method on problems as following. Communication contexts were not well-arranged due to the absence of immediate responses, or irregularity of time on emails is hard for users to grasp the context of the communication.

3) Adjusting the gap between network communication model and communication model in actual world

Human beings are not building the strategy of communication by the media or network, but creating them by contents, task, or objects. Also narration and attitude for different objects and messages are chosen before starting communication. There needs to be network communication considering communication patterns or

features of human beings.

4) Rearrangement on network

There needs rearrangement by the different purposes from the viewpoint of development direction focusing on variety of methods and development of network services. In the end the sender needs to transfer the messages to the messenger, and the messenger has to deliver the message to the sender in the most appropriate way. This will eventually increase the frequency in using networks, and will decrease time and costs which were invested for selecting methods, creating messages, and managing various networks for utilizing digital networks.

6. Conclusion

The need of recomposing network which is focusing on human beings has been mentioned above. IT and networks have brought us a number of conveniences and positive changes. However, it still contains new problem, and its first movement on solving problems was man-machine interface (or user interface) to correspond to "difficulties in using." Now it is about the time to reconsider newly occurring problems and one of those problems can be included in the area of network usages. By cynically judging benefits and losses which human beings have when using networks, we need to figure out the way to reduce its losses. As networks were developed not by human-centered method but by network-centered methods, this research suggests the direction to improve the problems while searching for various problems occurring between networks and actual communication environments. Above all, it should correct the phenomenon in which human beings are restricted by network for being more convenient, and there needs a number of viewpoints and solutions for this.

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