

Digital Communities in a Super-Aging Society utilizing Human-Centered Technologies

Yoko Nameki[†] Natsumi Kurashima[‡] Chin Kenwa[‡]
 Chuo University[†] IBM Japan[‡] Kyndryl Japan[‡]

1. Background

It is expected that everyone can easily use new devices, functions and services, and benefit from advanced Information Technology in Society 5.0 [1]. However, the information gap among older adults in the Internet society is becoming more pronounced as face-to-face communication is severely restricted by COVID-19. One of the reasons that older adults have difficulty accessing IT-based information is too complicated for them to create a mental model [2].

A mental model is an "image of behavior", such as "A will happen if B happens". People's behavior is greatly influenced by their mental models. When using digital devices, users need to create a mental model not only of the inputs and outputs of the device in front of them, but also of the applications that run inside the device and the data on the Internet that lies beyond it. Fear and anxiety caused by the inability to create a mental model will act as a disincentive to the use of digital devices. It is assumed that those older adults can utilize smart devices if an appropriate mental model can be created.

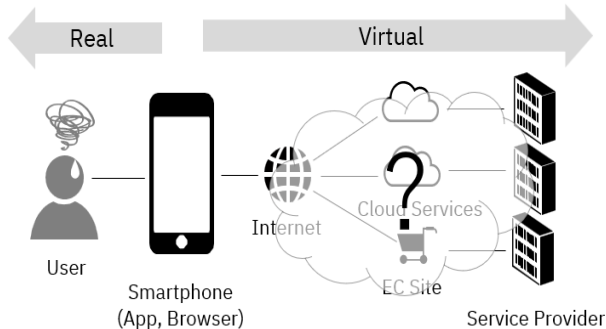


Figure 1. A User without an Appropriate Mental Model

2. Field Experiment

2.1 Survey Interviews

We conducted survey interviews with older adults to investigate how the difficulty of creating a mental model affected the use of digital devices [3]. Two examples are shown below:

Case 1: Age 84, Female, Living alone, Low IT literacy. A sense of anxiety due to lack of proper mental model prohibit her from using a smartphone. Thanks to continuous practice supported by her daughter who

could visit her 2-3 times a week, she was able to master simple operations of a smartphone. Though it took a long time, she could adopt simplified mental modal through a step-by-step approach.

Case 2: Age 85, Female, Living with Family, Medium IT literacy. Without proper mental modal of text input UI, keypad and cursor, she couldn't move cursor from subject to body field and didn't know what was wrong. By explaining the meaning of the "|" indicating the cursor position and the fact that user can input text at the position where the "|" is located, she could build a proper mental model and mastered text input using a smartphone.



Figure 2. Cursor position on input screen

2.2 Senior Support Community Survey

There are some useful findings from a survey conducted by a Senior Support Community.

- i. Older adults tend to have higher motivation to be taught by their peers who can share the same challenges rather than younger people.
- ii. It is important to clarify the purpose of using the tool, not only how to use it, before starting to learn.
- iii. Once an older adult shows interest in digital devices, it is necessary to stay close, encourage, support, and continue to promote their use.

The results showed that family and community support is effective in facilitating older adults to create mental model and become accustomed to the use of digital devices. However, it is sometimes difficult to provide continuous support to older adults, and how to ensure continuity is a challenge to solve the digital divide among older adults.

人間中心技術を活用した超高齢社会におけるデジタルコミュニティ

[†] 行木陽子, 中央大学

[‡] 倉島菜つ美, 日本アイ・ビー・エム

[‡] 陳 建和, キンドリルジャパン

3. Proposal

We propose human-centered information technology, specifically Ambient Computing [4], as a method to realize digital community where older adults can utilize information technologies without stress, access necessary information, and communicate with each other. The use of human centric technology can simplify their mental model, promote digital device usage, and encourage their participation into the digital community. If local community activities can be digitized and expanded into a virtual space, the way older adults interact with their local community will change dramatically.

Older adults who have difficulty using digital devices due to a lack of mental model can leverage Information Technology and participate in the digital community by creating their mental models with human centric technology. Within the digital community, they will not only be able to reduce restrictions due to declining physical capabilities but also by receiving continuous support, they can have opportunities to join community activities themselves. For example, older adults who are unable to go out have been on the receiving end of nursing care and related supports. However, in a virtual community, they can become providers of consultation support by utilizing their knowledge. They can share their knowledge and experiences in specialized fields they have cultivated during their working years, impart their know-how in various industries, train young engineers, and so on.



Figure 3. Expected benefit for older adults by Human-centered Technology

4. Potential of Digital Community utilizing Human-Centered Technologies

From an era in which many people accessed and used a single computer, to an era in which each person used a single computer has arrived, then now we live in an era in which each person uses many devices. However, the user interface remains technology-driven and has not yet reached the point where it should be generally easier to use. Ambient computing is a concept that aims to realize an environment in which users can use devices without knowing anything about them, and it is a way of thinking that fundamentally overturns the issues related to the operation of digital devices, which is a major factor in digital divide among older adults.

The word "ambient" in ambient computing means "surrounding or environment". Currently users need to operate digital devices or personal computers to

access information or use applications. In ambient computing, the use of specific hardware is not assumed, and the various devices that exist in the surrounding environment recognize what the user wants to do ahead of time and realize it automatically. Various technologies such as voice interfaces, speech recognition, IoT, cloud computing, wearables, XR (Cross Reality) and AI are organically combined to understand what is happening in the real world, predict what users intend to do, and respond to changes in the situation to facilitate appropriate responses by responding to changing situations.

XR Technology, that enables diverse visual experiences by combining real-world images with computer-generated virtual images and information, has a very important potential for realizing a society in which older adults can enjoy the benefits of advanced IT technology. With proper use of XR Technology, creation of mental models for older adults could be simplified which enables them to participate in various social activities without being aware of the decline in physical functions associated with aging.

5. Conclusion and Discussion

We are convinced that the realization and activation of digital communities utilizing human-centered technology will be the cornerstone for realizing a truly super-smart society. Older adults can improve their quality of life by utilizing their own abilities as providers of support. In addition, it is expected that these findings will be diffused and feedback through the community, motivating the older adults as service providers and forming an ecosystem that leads to better services.

References

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