Research on notification methods for breaking user's habits

Mariko Kikugawa

School of Knowledge Science,
Japan Advanced Institute of Science and Technology
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People have habits when performing daily tasks. It is difficult to break habits, which affect a human body. People may not be aware that they are engaging in habitual action. To break habits, users have to receive notification that they are engaging in habitual actions. However, such notifications tend to disrupt a user's concentration and interrupt the task. Most research on notification has provided a solution for only one of these problems. When a notification system gives precedence to maintaining the concentration, users can complete the task smoothly. However, their habit remains intact because habits are strengthened when one engages in the habitual action. Therefore, a notification system must maintain the user's concentration on tasks as well as correct bad habits.

For these problems, this paper proposes two methods. Our proposal targets bed posture in the VDT (Visual Display Terminal) task. First approach is the method that it inserts notification into operation. People use their hand when they operate. People use their lower back when they correct their posture. Thus, people can correct their posture and operate VDT device at once. People can notice the change related their task if they concentrates in their task. The change that was inserted operation can give recognition to concentrated people. We developed the system that handles preference of operation when a user changes their posture. We evaluate that the system maintain the user's concentration on tasks as well as correct bad habits by questionnaire. As a result, notification was mistaken for worse of VDT device's performance. The details are mentioned in Chapter 3.

Second approach is the method that showing long-term effect. Understanding a habit's bad effect motivates people to correct the habit. We propose a method that makes a person conscious of the bad effect of their habit. To break a user's habit, a user has to recognize the long-term effects rather than short-term ones. We focus on eyesight, the sense that is principally used in performing a task. To enable users to maintain concentration on the tasks, we propose changing operability during a task. Specifically, we offer a system that blurs the vision displays when a user alters their posture. We identify a user's posture as the distance

between the user and the display. We estimate poor posture when the user comes close to the display. Our system notifies the user of their posture. Our system measures the distance between the user and display using a distance sensor on Kinect. The distance is divided into several levels. Our system notifies a user of their posture from the distance between the user and the display and by translating the user's posture. Our system then sets the blurring filter on the display. We associate the distance between the user and the display with the blurring level.

We performed two experiments on second approach. In user study 1, we evaluated whether our system affects a participant's concentration. In user study 2, we evaluated whether our system can alert the user about their posture and motivate them to correct it. In user study 1, Participants received posture information when they were performing the typing task. We informed the participants about the notification system. The blurring level perceived by the users and the actual blurring level were different. Before the typing task, we identified the blurring level of each participant. Three tasks caused the participants to lean forward. Task 1 and Task 3 are typing task. Task 2 is searching task. Participants performed VDT tasks with four notification methods. In "Notification method A, " no notification occurred when participants had poor posture. In "Notification method B, " the window-notifying participants of their posture were displayed when they had poor posture. In "Notification method C, " the message about participant's posture was displayed at the corner of the display. In "Notification method D, " our proposed method, the displayed image was blurred when the participants had poor posture. We measured the work efficiency to determine if the concentration was maintained for the VDT tasks. We compared the length of time spent in performing such tasks and the percentage of correct answers of each notification method. We calculated the percentage of correct answers. We calculated the average of these values with each notification method. The percentage of correct answers was high for all the notification methods. We calculated the average number of seconds spent completing each task. In Task 1, the number of seconds spent completing the task with notification method B is much different than that with other notification methods. In Task 2 and Task 3, there are no differences between each notification method. We think that the percentage of correct answers is high in all notification methods. Participants had their concentration on tasks disturbed in notification method B. In Notification method D, the length of time was shorter than the one in notification method A. We think that notification method D did not affect the participant's concentration on tasks. In user study 2, we estimate that our system can notify a user of their posture and accelerate correcting it. Our system gives users a long-t effect. In our system, the more the user breaks their posture, the more long-term effect is emphasized. Thus, we think that our system gives users long-term effect and information about posture. To estimate showing long-term effect, we must separate the effect from showing long-term effect and the effect from giving information about the user's posture. In this examination, we use two notification systems: our system and the notification system, which gives only information about the participant's posture at the head of the display by text. We did not inform all the participants about the notification methods. We had participants read an article chosen by us. When participants read the article, they started to read related articles. During the experiment, participants may change their posture. During experiment, system wrote down the distance between the participants and the display. Participants said about the change in display when they recognize the notification. After the reading task, participants answered four questions. In the method that gives information about a participant's posture, participants took correct

posture 40 % of examination time. Participants did not said about the change in the display. In the method that gives long-term effect, participants took correct posture 70 % of examination time at from 20 minutes to 40 minutes. Participants said about the change in the display. The method that gives information about the participant's posture can make the participant understand, but it cannot motivate the participant to correct their posture. The method that gives long-term effect can be recognized by the participant, but is difficult for users to understand. All the participants want to remove notification. They said that if they understand how notification is removed, they correct their posture. Thus, the method that has a long-term effect can motivate a participant to correct one's posture. The method of giving information about the user's posture can make them understand. The method of giving long-term effect can motivate a participant to correct their posture.