

Title	組織の知識創造に対して効果的なビデオ画像通信の利用方法に関する研究
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## Abstract

There have been numbers of video communication system developed such as advanced conferencing systems pursuing face-to-face meeting, and informal communication systems that use video links as triggers of communication. However, effects of using video links on the quality of remote collaborative work were still unknown. In this paper, we studied effects of video communication on remote cooperative work by conducting user experiments, and clarified effective use of video links for organizational knowledge creation.

This paper focused on two aspects of communication, formal communication and informal communication. Prearranged meetings are categorized into formal communication. Unintended interactions that take place when people meet each other by chance are categorized into informal communication. Several literatures demonstrated importance of informal communication for organizational knowledge creation such as developing new collaborative relationships, and sharing serendipitous tacit knowledge.

In our formal communication study, we studied the effects of video communication on problem solving tasks by conducting user experiments that compare the quality of collaborative work under different communication conditions. We found different video communication effects on two types of problem solving tasks, one that provides a demonstrable correct answer, and the other is decision-making type problem solving for which the correct answer was given by the consensus of expert. Prior researches showed video links have little effect on cooperative problem solving, while video links showed significant effects on tasks with conflicting motivation. Subjects under video conditions were more likely to reach an agreement while subjects under audio-only conditions were more likely to break off negotiations. Short hypothesized visual communication is more person-oriented, and less task-oriented than audio-only communication, thus the visual channel had few effects on cooperative tasks in which interpersonal relationships between participants are not so important. In contrast, we found significant video communication effects on cooperative problem solving tasks that is coherent with Short hypothesis. McGrath classified problem solving tasks into two types, one that have a demonstrable correct answer, and the other is decision making type problem solving for which the correct answer was given by the consensus of expert. Our experiment using a problem solving task that provide a demonstrable correct answer showed significant video effect on reaching group answers in given time limits, however, there was little effect on improvement of the quality of answers. On the other hand, our experiment using a decision-making type task showed significant video effect on improvement of the quality of answers. Video communication might emphasize interpersonal aspects of communication, and then subjects in the problem solving task that provide demonstrable correct answers tended to trust their partners answer without discussing detail, while subjects in the decision-making type problem solving tended to be thoughtful of partner's opinions, and resulted in better quality of answers. These results suggested that it is important to use video links in decision making type problem solving, but it is not always recommended to use video in problem solving that provide demonstrable correct answers.

In our informal communication study, we proposed a new interaction model that introduced the sense of distance that affords natural informal communication behaviors, and confirmed the effect of video links by conducting a user experiment. Previous research systems provide a glance function for facilitating informal communication, by which a caller can glance the situation of her/his recipient for deciding to start conversations. Experiments revealed, however, these actions intruded upon their recipients activity immediately after establishing a video link for glancing. We claimed that the problem was caused by lacking of the sense of distance among users in media space and breaking down appropriate behaviors and social rules that afforded by the sense of distance (Proxemics). We introduced the sense of distance by creating public places and private places in media space. A caller approaches a recipient from a public place that shared by neighbors of the recipients instead of directly intruding into the private place of the recipient. Encounter in public places may afford behaviors like greeting each other, or simply ignoring, but do not afford any social imperative to start a conversation. A caller also has the opportunity to start unintended interactions with neighbors of a recipient. We developed prototype system that embodies this model, and conducted a user experiment. The result showed significant effect on frequency of a conversation category 'asking questions'. Evidences of unintended interaction were also observed.