

Title	知識創造活動過程で揮発する知識断片の収集とその活用に関する研究
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Abstract

There have been quite a few cases in which pieces of knowledge that had been determined useless in certain situations were utilized as valuable ones in other situations. For example, the glue of Post-it is a useful material because it can easily attach and detach in many times. However, it was originally developed as an ordinary type of glue and hence it was regarded as a failed product and as useless knowledge. Like this, “useless knowledge” is not always useless; it has potential values. However, it is usually difficult for people to find latent real value of the “useless knowledge”. It is just discarded and opportunities of new knowledge creation such as Post-it are eventually lost. Hence, we should recognize and find the real value of knowledge that was regarded useless, and should create measures to fully utilize it. Conventional researches on knowledge engineering has mainly put stress on how to create and to (re)utilize “useful” knowledge; there have been no attempts to utilize the “useless knowledge”.

This dissertation focuses on such “useless knowledge” and creates measures to utilize it to prevent loss of opportunities of new knowledge creation. There are two types of the “useless knowledge”. The first one is the knowledge that is once externalized but that is unused in the final outcome. I named it UUK (UnUsed Knowledge). The other one is the knowledge that was thought in mind but that is not externalized because of some reasons. I named it UNK (UnNecessary Knowledge). I describe measures to efficiently collect and to utilize both of them in this dissertation. As for UUK, I consider UUKs generated in a document composition task. In the document composition, many text fragments that were once written are often deleted and unused. Such deleted text fragments (DTFs) are regarded as UUKs of the document composition task. As for UNK, I consider UNKs generated in a Brainstorming (BS) session. In BS, people often criticize others’ ideas in their mind. However, the rule of BS prohibits them to express the criticisms. Such criticisms buried in their mind are regarded as UNKs of the BS.

In chapters 3 to 5, I study on means to collect and to utilize DTFs. Chapter 3 explores an efficient mean of collecting DTFs. I implemented two document composition support systems, i.e. “DTF collecting editor” and “Text ComposTer”. DTF collecting editor is a text editor equipped with a function of collecting DTFs that are generated by operations to delete characters such as hitting the backspace key. Text ComposTer is a document composition support system that is equipped with a function to support from upper-stream process to lower-stream process of the document composition process. It allows to separately collect DTFs with different granularity as R-DTFs (Rough-grained DTFs) and F-DTFs (Fine-grained DTFs). I conducted experiments of writing documents with using these systems, and analyzed obtained DTFs. As a result, it was revealed that Text ComposTer can more efficiently collect DTFs. In chapter4, I conducted experiments to analyze possibilities of utilization of DTFs. As a result, it was found that DTFs can be utilized in various phases of creating new documents, and that R-DTFs, in particular, have high possibility to be utilized in creating new documents. Chapter 5 investigates whether R-DTFs collected by Text ComposTer are actually used in new document creation, and, based on the experimental results, discusses design of environment to utilize the DTFs as an intellectual resource.

In chapter 6, I study about means to collect and to utilize criticisms generated in BS. I hypothesize the outcomes of BS can be improved if critique does not impede divergent thinking. To collect and to utilize the criticisms under this restriction, I created "Criticism Climber," which is an electronic BS system. Users of this system are divided into two groups, i.e. a BS group and a criticizing group. The BS group conducts a BS session as usual, while the criticizing group gives criticisms to the ideas generated by the BS group. The criticisms are provided to the BS group after the BS session finished, and the BS group is required to create further ideas to solve and to overcome the criticisms. I conducted user studies using Criticism Climber and obtained valuable findings on how the criticisms are effectively used in BS.

Finally, chapter 7 concluded this dissertation. I mentioned contribution for knowledge science and described future perspective.

Keyword: mining values from useless knowledge, knowledge reuse, document composition support system, electronic brainstorming system