Visualization of Insight Process in Concept Creation Focusing Handwriting Features

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ABSTRACT

In order to support concept-creation, the authors focus on handwriting assuming that it should contain the information on the process toward insight. As a result of intensive analysis of handwriting in concept creation process, one observation is that pen speed gets faster on insight after the period in which pen speed is relatively slow or time gaps get increased. Another observation is that pen pressure gets higher on insight after the same kind of period as above. Based on those observations, the authors derive a hypothesis on relationship between insight process and handwriting. In some situations, they could create new concepts by getting aware of inconsistency or constraints, by making their viewpoint changed, and then by getting an insight. The authors think those processes can be visualized through handwriting by monitoring some features like writing speed and pressure, and this could be effective support for concept creation.

Keywords: Annotation, Chance Discovery, Concept Creation, Handwriting, Insight, Meta Cognition

INTRODUCTION

Motivations and Goal

Globalization and evolution of ICT have changed business environment in recent years. But creating novel ideas and concepts is still crucial and fundamental in planning new products and business models. In order to support idea and concept creation, various methods have been proposed. KJ-method and brainstorming are well known and widely used in the office meetings. And visualization tools of personal thinking process, such as “Mind Map,” are very popular among businesspersons and students. These methods and tools help us to create new ideas and concepts by providing snapshots of our understandings at the time. But there are still wide gaps between the visualization of intermediate status and the innovative ideas leading to the new business and products finally. Idea creation is central issue as seen above, but we owe getting new ideas to our experiences or tacit knowledge at the moment.
The purpose of this research is to realize a concept-creation support tool which can be useful in the usual business scene. In this context, the concept-creation support tool should not request any special input to users. All the users have to do are just typing the keyboard, writing with pen, speaking as usual. That is, we do not aim to implement special tools which requires users to do the extra action. We analyze users behaviors in ordinary situation of the business scene at the deeper cognitive level. Germs or Signs of concept creation are expected to be clarified through the analysis and our consideration. Based on the extracted germs and sings of concept creation, the tool feeds back some information or suggestion which leads the users to create ideas. In this research, we focus on building the methods to extract the germs and signs from the usual situation in the business scene, and the methods to utilize the information in order for users to create novel concepts.

**Related Works**

As a model for concept creation in cognitive psychology, Finke proposed Geneplore model (Finke, 1996). This model defines human’s cognitive process in creative activities as an interaction of the generation phase and the exploration phase. In generation phase, initial mental representations, known as the preinventive structures, are generated by retrieving memory and synthesizing fraction of idea. In exploration phase, the preinventive structures are interpreted so that they become consistent in some context, and novel concepts are created and eventually refined through these two phases working repeatedly. When a person comes up with a germ of new idea, she or he brings it up to a new concept by continuing to refine and modify it. In such situation, we can say the generation process and the exploration process of the Geneplore Model operate by affecting each other. But in real situation, we often have the experiences that we struggle for going out of the stagnation of thinking before reaching a new idea. We know it is difficult to expand a germ of new idea. This kind of stagnation is known as impasse (Domminowski, 1995) in insight problem solving. And exit from impasse is explained as a result of switching from the inappropriate problem space to the preferable problem space. The next generation of supporting tool for concept creation needs to help us to switch from the generation phase to the exploration phase of Geneplore model.

We focus on handwriting as a clue to solve this problem. We make discussions while drawing diagrams on blackboard in meeting room, for example. Underlines and circles for highlighting keywords on printing documents are also written in intensive reading. Handwriting plays important roles in concept creation. Handwriting visualizes the germs of ideas, which are the representation of the psychological status. New concepts can be created not only by viewing the handwritings but also by writing itself. Based on above considerations, we hypothesize handwriting data should contain the information on process of concept creation. Note that handwriting data means not only trajectory of pens but also information on when and how written.

In this paper, we analyze handwriting data in concept creation process, especially in the case of transfer from generation phase to exploration phase in Geneplore model, and of switching out of impasse. And we try to set up a hypothesis on insight process in concept creation.

**HANDWRITING IN CONCEPT CREATION**

Pen and paper are indispensable tools for creative work (Sellen, 2001). Most of people might realize that meetings become more productive by writing out issues and remarks on the white board in the meeting room rather than only by oral conversation. In the meeting, issues and remarks written out on the white board enable attendees to share them and to look down on the whole discussion process. Figure 1 is an example of handwriting in a meeting. Taking a comprehensive view to the remarks could help us come up with an unnoticed concept.
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