How sketching can affect the idea generation process in design group meetings

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This study consists of four experimental idea generation meetings, which explore whether functions of sketching in design activity are also valid for idea generation meetings.

The relevant functions of sketching found in theory are: 1) supporting a re-interpretive cycle in the individual thinking process, 2) supporting re-interpretation of each other's ideas in group activity, and 3) enhancing access to earlier ideas. To examine these three possible functions of sketching activity in a group, a model is introduced that considers sketching activities as interactions with the group's external memory. In each meeting both a technique that includes sketching and a technique that includes writing as the primary mode of communication was applied. Differences in the participants' linking behavior for these two techniques were compared. The results provide some support for the first and the third functions of sketching. No support was found for the second function.
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Idea generation techniques, like brainstorming, are commonly applied by designers as a means to come up with original design ideas. In the existing body of idea generation techniques, the primary mode of expressing ideas is in written language. Usually, during idea generation meetings, brief descriptions of ideas are listed on a flipchart. In contrast, when involved in unstructured design meetings, designers tend to make extensive use of sketching when generating design ideas. Design thinking researchers regard this activity of sketching as a means to spur creative thought. Many lines drawn in

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a sketch are incomplete and can be interpreted in different ways. This is referred to as 'ambiguity' or 'indeterminacy' (Goel, 1995), which enables designers to re-interpret what they have just drawn, and to proceed designing with the newly acquired insights. The interaction that designers have with their sketches is seen as essential to creativity in design activity (Purcell and Gero, 1998).

In the creative problem solving literature, these creative qualities of using sketching are much less emphasized. In his categorization of active ingredients in idea generation techniques, Smith (1998) presents the use of making graphic representations of the ideas as a 'display stimulation tactic'. He mentions: 'Presumably, when visually depicted, ideas are more able to inspire new ones' (p. 125). Granted that this may also be a valid function of a designer's sketching, it does not cover the creative functioning of sketching as found in the design thinking research literature.

The objective of this paper is to explore whether the functions of sketching as proposed in design thinking research can also be relevant for idea generation meetings. If this is the case, utilizing these functions may enrich creative problem solving activity. First, we will describe the functions of sketching in design activity and how they may be applicable for idea generation meetings. To examine these three possible functions of sketching activity in a group, a model is introduced that considers sketching activities as interactions with the group's external memory. Then we will describe the research method used, called 'linkography', with which we take a process perspective: investigating the qualities of the connections between the ideas, rather than the qualities of the resulting ideas themselves. Next, we will discuss the results of an experimental study, which consists of four idea generation meetings in which both graphic and written language are used as a means for idea notation. In the final remarks, we will address some limitations to this research, suggestions for further research and suggestions for developing idea generation techniques that involve sketching.

1 Functions of sketching in design

In his book 'Engineering and the mind's eye', Ferguson (1992) identifies three kinds of sketches, which may be useful for identifying the role of sketches in creative design groups: the thinking sketch, the talking sketch, and the prescriptive sketch. *Thinking sketches* refer to the designers making use of the drawing surface in support of their individual thinking processes. According to Ferguson, engineers use the thinking sketch 'to focus and guide nonverbal thinking' (p. 97). *Talking*