Seeing and discovering: how do student designers reinterpret sketches and digital marks during graphic design ideation?

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This paper discusses and examines the impact that design tools have on reinterpretation during graphic design ideation activity. It discusses the vital role that reinterpretation plays in the design process and reviews existing empirical studies concerning reinterpretation. It also discusses broadly the differences in ambiguity levels of conventional paper-based sketches and digital tools. The paper presents results of an experiment designed to capture and compare instances of reinterpretation by student designers. The results suggest that, while students are capable of reinterpreting the digital marks as other forms, they are less successful at turning those new digital forms into new ideas. It would appear that whilst not causing reinterpretation, paper-based sketches, more than digital tools, can support the vital process of reinterpretation that generates new ideas.

Keywords: creativity, design process, design tools, drawing, graphic design

It is vital that we equip students with the ability to make well-informed decisions about tool choice and tool use during design ideation. As well as teaching production skills using tools (for example, how to draw more accurately, or to use software more efficiently), could we also teach students how to use tools to facilitate the generation, not just the execution, of ideas? A fundamental question that this paper raises is – to what extent do externalisation methods and use of particular tools impact upon the ideation stage of design?

Broadly the purpose of this paper is to discuss:

1. Why reinterpretation is an important part of ideation activity.
2. To what extent tool use may impact upon the process of reinterpretation for student designers.

1 What is a tool?

Tools are used to externalise ideas and mental images. A tool may be defined as 'a moving entity whose use is initiated and actively guided by a human being, for whom it acts as an extension toward a specific purpose' (McCullough,

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www.elsevier.com/locate/destud
0142-694X $ - see front matter *Design Studies* **31** (2010) 439–460
doi:10.1016/j.destud.2010.05.003

1998, p. 68). The specific purpose of the tools in this study, is the design of an artefact, as the hand is physically extended by an ability to make external marks, be those on paper or on screen.

This paper examines two broad 'tools' – use of pencil and paper (resulting in a sketch) and the digital design tool (design software running on a computer system). The term 'sketch' refers to the result of a rough, preliminary mark-making activity. Sketching, according to McKim (1972, p. 123) is performed quickly and has a freshness which is not always evident in a polished, drawn-up version of the design. It is also concerned with broad features rather than details.

The digital design tool refers to any computer-based graphics software in which selection and manipulation of pre-defined shapes or freehand lines can occur. Preliminary digital designing is the focus of this paper, which, like sketching, is a phrase used here to describe rough and possibly playful designing, early on in the design process. The particular features of a specific software package is less interesting to us at this stage than the two key methods of digital design working – freehand digital drawing (self-generated marks) and shape selection and generation (ready-made marks).

Particular tools make, by application of default settings, particular types of marks with certain visual characteristics. Bermudez and King (2000, p. 41) refer to their view that 'rather than being neutral, transparent and timeless, media and processes are intentional, substantial and timely'. Media provide a context or an environment within which we consider our design discipline. Putting this in a designer's terms, the software or pencil may 'frame' our view of our actions.

The impact of the form and shape of the marks made on design thinking is one area to examine. Implicit in this however, is the examination of how the marks are made, and the impact of that process of making on the process of thinking. There is evidence to suggest that, for instance, the word processor impacts on certain processes when writing. Haas (1990, p. 166) compared writing using pen and paper with writing on a word processor and found that planning was much more extensive when using pen and paper. Kellogg and Mueller (1993, p. 41) also suggested that rather than improving cognitive performance the word processor encouraged the adoption of a poorer writing style. It seems reasonable to suggest that design software could play an even larger part in the way we design – not only in the restructuring of design activity and focus but also, given the importance of visual information for the designer, the way we generate ideas. This paper focuses on examining the impact that tools may have on one particular process, the process of reinterpretation.

2 *What is reinterpretation?*

A complex, bi-directional cognitive process occurs as the designer sketches. Schon (1995, p. 76) famously described the act of sketching as a conversation