Design Flow 2.0, assessing experience during ideation with increased granularity: A proposed method

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This paper presents a new method to measure designers' experience during ideation, by using the technique of self-observation instrumented with a device and an original software. Based on the previous concept of Design Flow and the experience fluctuation model, the proposed procedure asks participants to rate their perceived challenge and skills at each moment of their ideation session while watching the video recording. The method aims at increasing granularity of Design Flow and reducing time of interviews, while retaining the ability to analyse the ideation activity as a whole, not just selected excerpts. After performing a validation test confirming its effectiveness, we conclude that this method is a fast and practical way to obtain continuous quantitative data about designers' experience that can be analysed and triangulated with other sources of data (e.g. verbal analysis).

Keywords: design research, design flow, psychology of design, evaluation, research methods

Ideation (or conceptual design) is probably the most important phase of the design process. During ideation designers and other relevant stakeholders generate the ideas and make the decisions that will shape the final design concepts (Cross, 2006). At this stage, initial concepts, which are developed by graphic representations allow the designer to continue with the other phases of the design process, which will fully define the design object and eventually lead to its fabrication. Ideation is a complex activity at the core of the *design thinking*, in which dynamics between designers, their representations, and their tools are entangled together. For these reasons and also because *design thinking* is gaining popularity in disciplines other than design, such as business, IT, medicine, education (Dorst, 2008; Farrell & Hooker,

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2013), it is a common interest to better understand the ideation process and which factors can affect it.

Cognitive science has made attempts to study ideation, with highly controlled lab experiments concerning task execution, while design theory applied idea generation methods. These two kinds of approaches are needed to develop holistic models of design ideation (Shah & Vargas-Hernandez, 2003). In order to evaluate the effectiveness of ideation we could consider outcome-based approach focussing on the evaluation of the ideas generated or on the results of the ideation process (Shah & Vargas-Hernandez, 2003). However, we eschewed this approach because it is based on the designer's performance, including idea-count, sum-of-quality, average-quality, and good-idea-count, the last being the most recommended (Reinig, Briggs, & Nunamaker, 2007). Evaluating the results of the process of ideation is difficult because it depends on the designer's experience and capabilities, which brings us on a subjective territory. Also, by focussing on indicators such as idea fluency, flexibility, and originality we don't obtain any information about how the person yielded the ideas and we risk to simplify the complexity behind ideation as a creative activity. Glaveanu (2013), for example, propose a framework (the five A's model) accounting for the complexity of creativity rooted in sociocultural and ecological psychology as well as theories of the distributed mind. Hennessey and Amabile (2010, p. 571) state that 'creativity arises through a system of interrelated forces operating at multiple levels, often requiring interdisciplinary investigation'. Taking a systemic perspective, they propose a model that includes different levels such as neurological, cognitive and affective, personality, group dynamics, social environment, and culture.

Design as a process has been approached mainly through protocol analysis (Cross, 2006; Gero, Kan, & Pourmohamadi, 2011). In these works, design was studied by analysing designers' behaviours, their conversations, and their sketches. In a previous study Dorta, Pérez, and Lesage (2008), proposed to complement these approaches adding the designers' subjective experience as an additional dimension to describe ideation, through the concept of Design Flow. This concept of *flow* (Csikszentmihalyi, 1997) is an optimal psychological state occurring when people are deeply engaged in a task, associated with creativity, positive affect and high performance (Engeser & Schiepe-Tiska, 2012). Applying this method to real design sessions, Dorta et al. (2008) found that designers' experience changes throughout the process and they observed patterns of experience characterized by a state of stress before the generation of a relevant idea, an optimal state (called state of flow) during the proposal of the idea, and a 'sense of control' after the idea was accepted. Later, they found (Dorta, Lesage, Pérez, & Bastien, 2010) a statistically significant difference in designers'

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