Using linkography to compare creative methods for group ideation

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This paper compares a new creative design method, based on the principles of drama improvisation, with brainstorming. The evolution and development of the Design Improv method is reviewed, and the results of an evaluation of both methods in controlled team ideation sessions are documented. The creative characteristics relevant to their quantitative and visual interpretation are analysed using linkography, identifying the most prominent variations in performance with respect to inter-connectedness, parallel thinking and idea diversity. We describe an adapted and expanded process for robust linkograph development and reflect on the value, challenges and limitations of both the linkograph creation and the perceptive insights they can provide.

Keywords: collaborative design, conceptual design, creativity, design methods, linkography

Design ideation research is continually evolving. A number of studies have fuelled debate over the influences of different factors and interventions such as individual or group work; working environment; creative stimuli; and different processes for generating and recording ideas, for example (Faure, 2004; Howard, Culley, & Dekoninck, 2011; Knight & Baer, 2014; McMahon, Ruggeri, Kämmer, & Katsikopoulos, 2016; Vidal, Mulet, & Gómez-Senent, 2004). Studies often involve a comparison of two or more ideation methods, with measurements of their creative outputs as the key discussion points. Some use a simple quantity and/or originality measurement as an evaluation while others use more detailed creativity metrics such as those outlined by Shah, Smith, and Vargas-Hernandez (2003).

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However, measuring creative output does not provide the full story. For example, some have argued that while studies show group ideation to be less productive than individual, there are additional benefits that should not be dismissed such as improved organisational memory, building and pooling

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of designer knowledge and skills; and creating an attitude of support (Kohn, Paulus, & Choi, 2011; McMahon et al., 2016; Sutton & Hargadon, 1996). Furthermore, the outputs of ideation approaches intended for use in the early phase of the design process may not contain the level of embodiment and detail required to adequately utilise more in-depth creativity metrics. These require quantitative inputs and weightings of multiple functional attributes, which is simply not possible for the brief and discrete (yet potentially significant) ideas typically expressed during an early phase group ideation.

This phase therefore requires other ways to determine whether a particular ideation method is fostering creativity. By looking at the ideation process itself, we can gain insights into the style and quality of creative thinking, and in the case of group ideation, the style and quality of collaboration.

'Linkography' has become an established method for visualising and analysing design processes (Roozenburg, 2016). Originally developed by Gabriela Goldschmidt to evaluate the creative processes of individual designers (Goldschmidt, 1995). Further developments such as those by van der Lugt (2000) have enabled linkography to be effectively applied to the evaluation of group ideation in a product design and design engineering context through links that emerge as ideas are developed. While several accounts of this method exist in the literature, published accounts do not usually share the level of detail that would enable others to replicate the full link coding process efficiently and effectively.

Using data from a recent study on the application of improvisation techniques, developed for drama and comedy performance, to design ideation (Hatcher et al., 2018) this paper demonstrates the use of linkography to trace the development of ideas in a group ideation process, while also revealing the analytical power of this method when used to compare two alternative ideation methods. The new Design Improv method draws on the referents (rules) of improvised comedy aiming for collaborative divergence to overcome barriers that often prevent the full potential of group idea generation being realised. We present a detailed account and provide guidance on our adapted and expanded process for producing a robust set of linkographs for both methods, and discuss the various new and refined insights they provide when analysed both numerically and visually. These highlight the key differences between the ideation methods. We then reflect on the value, challenges and limitations of both the linkography creation process and its perceptive insights.

1 *Design Improv: its evolution and characteristics*

The new 'Design Improv' approach was initially developed through workshops with practitioners, students and professional improvisers (Hatcher et al., 2018) before being tested under controlled conditions. Following a

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