

## **What are the best conditions for designing future products? The use of variations of the brainstorming technique in individual and collective creative design situations.**

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One of the challenges in today's society is to satisfy the growing need for creativity and innovation, especially in design contexts, where designers have to come up with products that are both *new* and *adapted* to their users. Thus, a balance is required since designers must come up with original products that are quite distinct from existing ones, but which suit and do not destabilize users. Creative design situations therefore present a challenge for designers and this challenge is particularly important in the case of prospective ergonomics.

In order to favor creative design activities, we present studies that contribute to better identify conditions that can favor creativity in design, both in individual and in collective design situations. More precisely, first, we analyze the impact of variations of the seminal 'brainstorming' technique, in individual situations, on 32 students in design (1<sup>st</sup> study) and on 34 future generalist teachers (2<sup>nd</sup> study). Then we complement this analysis by a study performed in collective situations, with students in ergonomics (3<sup>rd</sup> study).

In all these studies, we compare the use of two variations of the 'seminal' brainstorming technique. In the 1<sup>st</sup> and the 2<sup>nd</sup> study, specific brainstorming techniques are used during individual activities: the first technique is focused on the generation of ideas while the second one aims to lead participants to focus on constraints related to the design project at hand. The impact of these two techniques is analyzed with regard to participants' creative performances, which are assessed by judges with regard to different criteria. The results we obtain show different effects depending on the participants' background. For students in design, who are used to develop creative activities, a technique geared towards the management of constraints related to the design project appears to lead to better performances, i.e. to the production of design projects that are considered as both new and adapted to the context. In contrast, for future generalist teachers, who have less frequently to develop creative activities, a technique geared towards the generation of ideas appears to allow them to produce projects that obtain higher scores both concerning the novelty and the adaptation to the context, by comparison to other experimental conditions (i.e. with a technique geared towards the management of constraints, or with a control condition).

The third study is based on the same specific brainstorming techniques but they are used in collective design situations by several groups of three students in ergonomics. The impact of these techniques is analyzed with regard to the participants' proposals (ideas and constraints) and by assessing their creative projects.

Based on results of these different studies, we will develop a discussion on conditions that can favor creative design activities depending on the participants' characteristics and on the fact that they occur during individual or collective situations.