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Collaborative creativity in prospective design activities: An exploratory study of the influence of static vs dynamic personas in a virtual environment

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1. Creative design situations and prospective ergonomics

Creativity and innovation are fundamental for the progress of individuals and society, and recognised as the engine of sustainable and competitive economies. Thus, it is a challenge for companies and for designers and/or design teams to come up with products that are both new and adapted to future users. Designers or design teams have to be creative in order to imagine and conceive new products but it appears particularly complex (Bonnardel, 2012). From a cognitive point of view, a main characteristic of design activities is that designers' mental representations are initially incomplete and imprecise. Only by going through the problem-solving process itself can designers complete their mental representations. It is even more difficult in the context of prospective ergonomics, which is turned towards the creation of future products that have not been identified yet (Robert & Brangier, 2012), since designers have both to detect existing user needs, to anticipate future ones, and to inject creativity in the design solutions they propose.

Moreover, in complex design situations, it is not only a single designer but a design team that has to perform creative activities. In these situations, the knowledge required for performing the design task is often distributed amongst different stakeholders who have different perspectives and backgrounds. For instance, design teams may consist of designers and specialists in ergonomics and, sometimes, end-users. However, the participation of this last kind of stakeholders is not always possible, due to pragmatic constraints (time, cost, availability of end-users, etc.). In addition, these collective activities may have positive effects on creative design activities, since people adopting different viewpoints or perspectives can propose new ideas, but also negative effects, such as production blocking due to an apprehension of evaluation or a social inhibition (Paulus & Nijstad, 2003). Therefore, our aim is to contribute to defining design conditions that can facilitate both creative and collaborative activities in design teams. Towards this end, we first present a specific user-centred design method that we find particularly promising: the *persona* method (see, for instance, Bornet & Brangier, 2013), which enables designers to focus on archetypal *future users* of the product or service to be designed. This method is thought to favour both empathy and creativity among designers, but only recently have some studies highlighted certain benefits and limitations of using the persona method (Bornet & Brangier, *ibid.*). Thus, our objective in the present study is to analyse the use and impact of a new kind of persona, which has the particular feature of being '*dynamic*', by comparison with a classical situation based on a '*static*' persona.

2. Classical persona method vs '*dynamic*' persona method

User-centred design methods can help designers understand users' expectations, needs and limitations, and take them into consideration during the design process. Among them, the persona method is based on the creation and use of fictional and personalized prototypes of future users, called '*personas*', which are associated with concrete representations comprising both textual descriptions and photos. In specific cases, personas may be played by a team member, which may be dependent on his/her performance as actor.

The specificity of our research is that we propose a new kind of persona method based on '*dynamic personas interacting through a virtual environment*'. Moreover, our aim is to compare its effects with the ones of a classical persona method, based on static descriptions. In our study, all interactions between the different stakeholders occur through a collaborative virtual environment (more precisely, Second Life) and in a written communication modality (or chat). These interactions may be less subject to social inhibition, especially, due to the anonymity that is allowed by the use of avatars. Information elements provided in the two kinds of conditions (dynamic vs static) are strictly the same but, in the case of the '*dynamic*' persona condition, participants interact with a '*dynamic*' persona who is played by the experimenter instead of reading the written description of the '*static*' persona. Indeed, the experimenter cannot suggest ideas and he/she intervenes in the discussion in order to express characteristics, needs, and points of view of the future user, similarly to information elements that are provided in the '*static*' persona.

3. Exploratory study

3.1 Hypotheses and method

In line with previous results, we assume that personas, whatever static or dynamic, can favour the production and selection of ideas that are both new and adapted to the design situation. Moreover, our *hypotheses* were that (1) a 'dynamic' persona could enhance more the production of new ideas than a 'static' persona, and that designers who have to deal with a 'dynamic' persona may develop (2) a higher quality of collaboration and (3) more empathy for future end-users than those who have to deal with a 'static' persona.

To *construct both 'static' and 'dynamic' personas* and to pre-define the contents of the interventions of the experimenter, we performed a pre-study during which real participants representative of future end users took part in discussions related to the design task at hand, and we conducted complementary interviews with representative end users.

Then, during our *exploratory study*, two groups of stakeholders were formed. They both consisted of a professional designer, a professional in ergonomics, and either a 'dynamic' or a 'static' persona. These groups had to perform a same creative design task related to future transportation, while interacting through Second Life. After performing this task, participants had to complete two questionnaires in order to determine their level of empathy with either the 'static' or 'dynamic' persona.

3.2 Results

These results are preliminary since only a few groups participated in our research. However, the first part of the data analyses tends to show *interesting comparisons* between the dynamic persona group (DPG) and the static persona group (SPG). Firstly, concerning the *design problem activities*, we observed that the DPG scored twice than the SPG in idea generation (respectively, 20 ideas vs 10 ideas), whereas the SPG scored twice than the DPG in analysis (respectively, 8 vs 4). Secondly, an analysis of the *quality of collaboration* tended to show a higher score, in the whole task, for the DPG than for the SPG (respectively, 58 vs 45.6, with regard to a maximum of 80). Thirdly, concerning the *empathy*, scores obtained with the two questionnaires showed that the level of empathy of the DPG was slightly higher than the one of the SPG.

A second part of the data analyses consisted in comparing ideas produced by these 2 groups with ideas generated by 11 groups of three 'lay-participants' (students in psychology) who performed the same creative task with the same communication modality in Second Life, but without using a persona method. First results about the *fluency* showed that the highest number of ideas was produced by the DPG and the lowest by the SPG, whereas the mean number of ideas generated by the 'lay-participants' groups (LPG) was intermediate (DPG=20, SPG=10, LPG=15.45). However, the *statistical originality* of the ideas (proportional to the average apparition frequency of a single idea in all the groups) appeared to be slightly higher in SPG than in DPG (respectively, 0.82 vs 0.72) and higher in these two groups than in LPG (mean of 0.60).

4. Conclusion

Although our research is exploratory, we observed interesting differences in DPG and SPG activities and performances. The DPG seemed to be more focused on the production of ideas and the SPG on problem framing, and it appeared to have consequences on the fluency and the statistical originality of their ideas. Thus, the applications of static and dynamic persona methods seem promising and will be further explored.

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