Understanding interactions in a co-creative situation through intersubjectivity: quantifying interactive levels using biosignals indicators

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Abstract of Dissertation

Design is a team effort that requires seamless human interaction if it is to be sustained and reach its maximum potential, and it is built on social relationships during collaborative design (co-design). Though co-creation has become widely used in recent years, few studies focus on its dynamics, which emerge from intense interactions created by the shared subjectivities of participants in, an intersubjective environment. The management and enhancement of interpersonal factors can help create this shared environment by leading the process from personal to interpersonal creativity. There is, then, a need to understand how interpersonal factors influence interactions in co-design, and this understanding can be achieved by using the insights gleaned from research on intersubjectivity, the field of social interactions. This study used a systematic literature review to identify and classify the different methods used to measure intersubjectivity and to see how this knowledge could explain the influence of interpersonal factors on interactions in co-design. The review identified 66 methods, from which four main categories were determined. Furthermore, 115 articles were analysed and systematised in an online database, leading to a new understanding of the role of interpersonal factors in measuring interactive levels in co-design. They revealed a positive relation, where a rising level of interactivity is helped by the formation and maintenance of co-creation, leading to a state of creative resonance where the experiences of individuals are closely related.

From there, it was shown that some interpersonal factors could be measured by looking at the data of biosignals that are used as social cues, particularly if studied in comparison with the data of one of the partners of the social interaction, thanks to the synchrony rate between these datasets. This synchrony of biosignals related to shared behaviours can be used to help qualify the interactive level dynamics occurring during co-creation in pairwork. An experimental approach was used to investigate this possibility, first with a preliminary study to test the methodology, after which it was applied in a co-creative pairwork setting. The biosignal (fEMG, EOG) results were compared to subjective feedback regarding the interactive level while looking at synchrony rates to understand the dynamics of the interaction. The results suggest the possibility of using the synchrony rate measured by the Damerau-Levenshtein distance (Ld) or dynamic time warping method (DTW) to quantify the dynamics of the interactive level in co-creative pairwork. The intensity of the interactive level was positively related to the synchrony rate measured by the DTW of fEMG using data from the zygomaticus major. This study will contribute to our understanding of the influence of the socio-cognitive process on interactions during co-creation to improve the co-creative design process.

Keywords: Biosignal synchrony, Intersubjectivity, Interpersonal factors, Interactive level, Co-design, Co-creation