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A GRAPHICAL REPRESENTATION MODEL FOR RETROSPECTIVE DESIGN PROCESS ANALYSIS

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In many cases, design processes are little formalized in design agencies. They include basic specifications and a few milestones, established between the main process stakeholders (designers, modelers, project leader, engineers, etc.) and/or the client. When these design processes are not satisfactory enough, it is thus difficult for all the actors to share the same conclusions. As no common formalized representation of the process exists, the actors often miss a global vision of the actual process, of its lack of efficiency, of the causes and levers to improve it (Sousa and Dinis-Carvalho 2021). One way for the actors to become aware of and share the effective course of their projects is to retrospectively and graphically represent the actual design processes (Hayes et al. 2011). Design “patterns” can thereby be detected and analyzed, in order for the processes to be improved with social, organizational or technical solutions.

In this poster, we focus on a typical medium-sized French design agency that works with some of the leading companies in the transportation industry to design and/or build vehicle concepts and prototypes. In this company, the organization of the design process is very changeable and flexible, and, for the most part, quite informal and uncontrolled, which can lead to potential stress for the designers and exposes to the risk of introducing under-quality for the industrial customers and end-users. However, design results are of high quality (effectiveness), despite an absence of evidence (user-centered validation is lacking). This is because designers are highly skilled professionals, organized by accumulated experience and habits. However, the design process would benefit from being more formalized in order to improve its efficiency first of all, but also its effectiveness (especially in terms of user experience integration).

We propose, in this poster, to collectively build with the designers, a retrospective graphical representation of a company’s design process which is shared by the involved players. This shared representation, in a second stage, will be the basis for a critical analysis and improvement proposals. Once this shared graphical representation is done, it will allow to initiate a collective awareness among the design players. This collective awareness will further serve as a driving force for change management and the search for creative improvement solutions.

From the needs of the focused design company, we established a requirements list to define the information required on the representation, such as the actors’ roles, task and decisions details, milestones, specifications management, validation and final user place in the process, as well as UX

dimensions considered. This list was then used as a reference to compare and rate the existing process mapping tools identified from our literature review (Bjarnason and Regnell 2012; Felson et al. 2013; Lespagnard et al. 2021; Macmillan et al. 2002; Rummler and Brache 2012). But it turned out that none of the existing models filled 100% of it.

We then decided to design and propose a new representation model by using a case study, conducted with a retrospective analysis method, as support. This case study is one of the latest company's completed projects, a *show car* for an important car manufacturer. Retrospective analysis allows to choose the most appropriate project to study between the past ones of the company. It also allows to have access to the whole process at a given time, in comparison to observing a project from A to Z, as a full project can last several months, which shortens the analysis.

A representation of the proposed model for this case study has been iteratively built from four semi-structured interviews of two of the project actors, each iteration allowing to refine the represented data, as well as the symbology and the representation principles of the underlying model. The representation of the case study thus served as a basis to refine the proposed model. However, if the represented data has been mostly validated (and corrected) by the actors during their interviews (on printed versions), the ability of the representation to create a shared view, as well as the understandability of the graphical language (the underlying model), are still work in progress. Nonetheless, the reactions of the interviewees to the representation are encouraging, as they drew on it to illustrate their explanations, indicating a good understanding. This proposition as well as the method followed will be further detailed in the poster.

Although it still needs further tests and validation, we believe that this proposition is an interesting addition to the existing process mapping models, both in terms of required functionalities and graphical efficiency. Compared to the present literature review, we argued that our proposition offers more functionalities than the identified models, and that the information is represented with great parsimony. This needs to be confirmed in future work.

Future work also includes to integrate the currently missing functionalities (extending user experience mapping, or visualizing the evolution of specifications for example), and to validate the genericity of the model. Some case studies on airlines seats projects are currently in progress for the latter. Moreover, experimentations should be conducted to validate the semantics of the symbology, the accuracy of the represented data, and the ability of the model to create a shared representation between the design players with the aim to collectively improve their design practice by building a shared mental representation. This will take the form of workshops with the design team, whose implementations are in progress as well.

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