

Designing a Design Process

Incorporating the Client in the Design of Automated Production Lines

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Concerns constructing a design process in which the client is more incorporated.

ENGIE is a large multinational company with two main branches: ENGIE Energy and ENGIE Services. Within these branches exists the sub-branch Industrial Automation. This branch concerns designing robotic machines that work in a production line. The branch has done automation work for Bolletje, Campina, Grolsch and more.

Recently, there has been a shift in the automation market. This shift has been called the introduction of *Industry 4.0*, which brings with it a need for more flexible production lines, which appeal to a larger client base. Since these clients often do not have much experience with robotics and automation, ENGIE needed changes to be made to their design process and proposed that maybe clients should be included in the design process.

Improving the design process to fit the new market and including the client more in the design process can result in faster, and less resource-intensive results. More importantly, the goal is to do this while keeping, or more desirably, improving the quality of the delivered products. Additionally, ENGIE hopes that with a new and improved design process, the projects they do will be more streamlined and can result in them gaining more clientele.

Intertwined with this assignment, the main question that must be answered is the following: Can the design process be made more efficient by including the client in the concept phase?

To achieve this goal, analyses have been conducted on ENGIE's process, client needs and techniques in collaboration, concept generation and visualization. The client needs have been analyzed and additionally, research has been conducted to find methodologies which help in getting results in a fast and reliable way. The techniques in collaboration, concept generation and visualization have been inventoried.

Additionally, the concept generation process has been analyzed and divided up in three phases: finding functions and physical principles, finding function fulfillers and the configuration and dimensioning of the machine.

These aspects have been combined into a method of involving the client in the design process. To account for the broadening market, the client base has been divided into three groups, of which two are extremes and one is a middle ground. The client can choose a technique in every category, in every phase of the concept generation. Additionally, choices on behalf of the three client types have been made to provide three 'default' choice patterns to be used as guidelines. The choices made generate a schedule with three milestones that will guide the design process, using techniques that the client deems appropriate, with a visual output that the client finds useful.

The idea to build a digital application has also come up and has been partly worked out, currently consisting of mock-ups and suggestion for a working prototype.

Client feedback and usability tests have shown that the great majority of test subjects have a very positive reaction to this way of working and feel that this method will greatly improve the

way ENGIE works with clients. By streamlining the first stages of the process, eliminating confusion over deliverables and deadlines and creating transparency, it can qualitatively be said that the design process, specifically in the concept phase, can be made more efficient. This includes time and resources, but more importantly this method will lead to end results of the same or higher quality, due to the client's involvement and ability to steer the process.

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