

Scenario Based Product Design

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Introduction

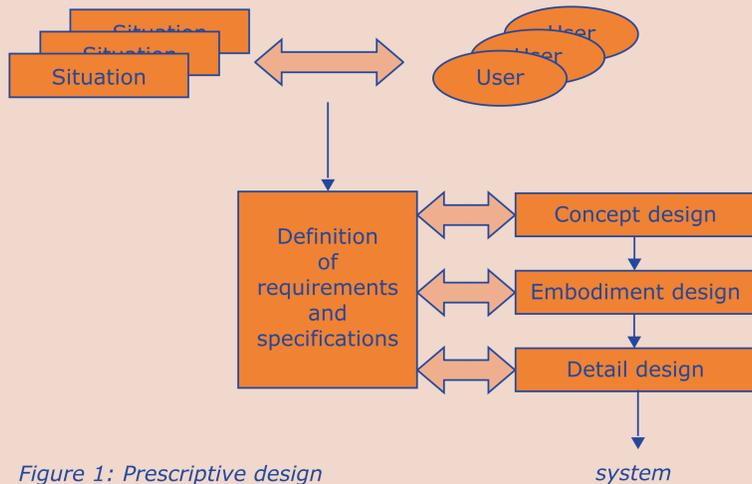


Figure 1: Prescriptive design

Every time a specific person is confronted with a specific situation, a specific problem may emerge. Designers have the aim to provide users with a solution to their problems. In prescriptive design (e.g. Koller, 1985; Pahl & Beitz, 1996; etc.), the designer interprets and translates the problems specific to individual users to one single problem definition consisting of a list of requirements and specifications. By reducing the individual problems to this single problem definition, important information is lost.

Application of a prescriptive design method results in a specific system. There is no guarantee that this system offers an adequate solution to the specific problem of the individual user in a specific situation.

In most situations where the system offers no adequate solution, the user will only experience some irritation about the (dis)functioning of the system. However, in case of systems that are used in critical situations (e.g. driving a car or controlling a dangerous machine), consequences of the fact that the system offers no adequate solution to the individual problem are likely to be more serious.

The scenario based approach is expected to be helpful in designing systems that offer solutions to problems for any user in any situation.

Scenario Based Design

The scenario based design approach is based on users who experience situations and define solutions, rather than on a designer who reduces individual problems to one single problem definition. Application of the scenario based design approach may result in systems that offer solutions to problems for any user in any situation.

Principles:

- Problems may become transparent when a user is confronted with a specific situation (an instantiation extracted from the situation database)
- The user is able to define and redefine solutions by combining components from the solution database and experiencing how this has an influence on the problem
- Constraints are formed by the rules of the game
- In order to consider the effects of constraints on the problems of the user and on the solutions he defines, the designer is able to adjust the rules of the game as well as he may redefine both databases
- In order to get insight in similarities and differences between individual users with regard to how systems are used to solve problems, the designer is able to invite other users to play the game
- By using Virtual Reality and gaming techniques, the level of reality is enhanced, compelling situations and dilemmas are created, associations are made easier, and implicit aspects are explicitly revealed

During the game, the user creates solutions that relate to the situation. He is able to experience how problems are solved or how new problems arise using these solutions. By observing the user in the scenario, the designer is presented with solutions to problems for this specific user. In a limited number of iterations with a limited number of users, the scenario based approach will result in concepts of systems that actually solve the problems experienced by users.

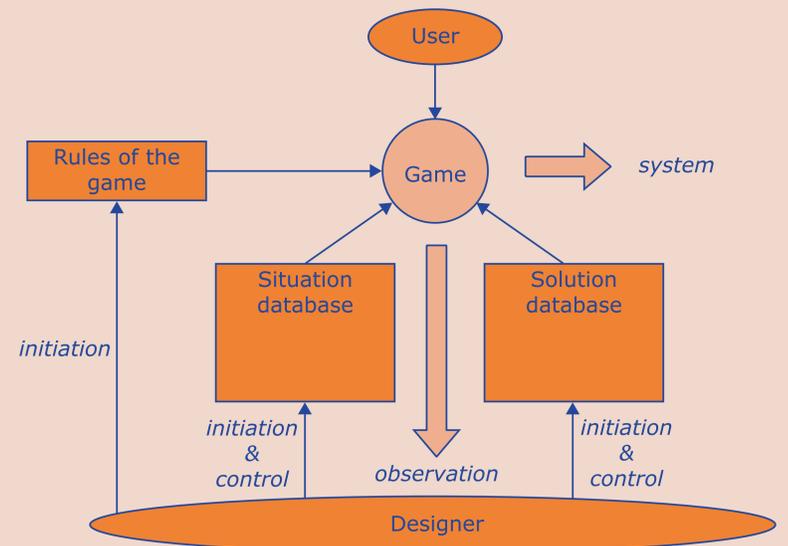


Figure 2: Scenario based design

Expectations

Application of the scenario based design approach is expected to be beneficial in the design of multi-domain systems. These systems -characterised by coupled mechanic, electric and software components- are growing more and more complex. When using a prescriptive design method (design based on a list of requirements and specifications), the resulting system is likely to offer an inadequate solution to the specific problem of the individual user in all situations. Especially when this system is used in critical situations, the consequences can be serious. It is important that any individual user in any situation is able to "intuitively" interact with the system.

It is expected that application of the scenario based approach:

- is especially beneficial in the design of multi-domain systems
- allows for exploration of all possible scenarios in critical situations
- allows to directly integrate the insights of users in the design
- allows for understanding of the interaction between problems and solutions

As a result, it is expected that concepts for systems emerge, that offer better solutions to the specific problems of individual users than systems created by using prescriptive design methods.

Next steps

A number of research questions have to be answered:

How to initiate the game?

A procedure needs to be developed for defining the rules of the game and creating a situation and a solution database.

How to treat users?

A procedure needs to be developed to select and instruct users and to determine the number of users that are required to extract useful design information from the game.

How to extract useful design information from the game?

It is expected that a lot of design information is revealed by the game. By making observations, the designer learns about solutions to user-specific problems in specific situations. However, there must be a procedure to translate all observations into one or more "optimal concepts" to be used for the embodiment and detail design of the system.

References

- Koller, R. (1985). Konstruktionslehre für den Maschinenbau. Springer Verlag, Berlin.
Pahl, G. & Beitz, W. (1996). Engineering Design: A Systematic Approach. Springer Verlag, London.

Conclusion

Designing is a process in which the designer's interpretation of the problems specific to individual users affects the outcome. By reducing the individual problems to a single problem definition, important information is lost. This can result in systems that do not offer an adequate solution to the specific problem of the individual user in all situations. The scenario based design approach shifts the interpretation of problems from the designer towards the users. It takes advantage of the inherent subjectivity of interpretations by enabling the user to directly integrate his insights in the design. Compared to systems created by using prescriptive design methods, systems created by the scenario based design approach could well offer better solutions to the individual problems of users in all situations.