

A Study on Creativity in Requirements Engineering

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ABSTRACT

The first step of requirements engineering is always: deciding what to build. While it may seem trivial, it is sometimes the hardest step in the whole project. In this report, we illustrate some experiences with a miniature creativity session that focused on the what-to-build question. The very limited time frame allowed at the same time very detailed controlling of the overall results. Thus, we can provide here quantitative results on the success of the workshop.

Keywords: Creativity, Requirements Engineering, Industrial Case Study

1. INTRODUCTION

Requirements Engineering typically starts with a rough sketch of what the product could be about while successively going into the details until a full specification is achieved. While the traditional view is that the difference in information content from the first initial concept till the final product definition would be drawn from elicitation, typically the problem is that even the stakeholders do not have this information; it must be invented [1].

As a means for this invention of requirements creativity techniques have been proposed. In this paper we report on specific experiences with some techniques that were performed in a very extremely short time-frame.¹



Figure 1 Successive Deconstruction of System Concept

¹ The case study we report on in this paper has been conducted as part of an industrial cooperation of Fraunhofer IESE, while the author was employed at Fraunhofer IESE.

2. THE CASE STUDY SET-UP

Our case study was performed in the form of a half-day workshop. This did dramatically limit the time available for our techniques. In preparation for the workshop a small set of techniques were selected in order to illustrate the breadth of techniques available.

As a result of these criteria we applied the following three (types of) techniques. These techniques were selected from a draft version of [2], with the exception of the first one:

Deconstruction Technique. Initially, this was not intended as a creativity technique per se, but was intended merely to support the participants in thinking outside the normal boundaries. The basic idea of this technique was to start with the usual perception the developers had of their products and step-by-step remove certain constituents. Then the participants would need to replace them with something else. This is shown in Figure 1. The presented figures were used in order to support this activity.

Trigger Lists. Using questions as a means to support divergent thinking has been repeatedly reported in literature. We used two different question lists in our effort: one provided by Robertson et al. and SCAMMPERR [3]. These lists are given in Figure 2 and Figure 3 respectively.

Walt-Disney-Technique [4]. Compared to the previous two, this technique is defined much less precisely. It basically decomposes the creative process into three

Creativity Triggers (Robertson & Robertson)

1. **Service** – What better service can you provide?
2. **Speed** – what can you make faster?
3. **Information** – what extra information will the customer find useful?
4. **Participation** – how can you involve the customer?
5. **Connectivity**- what new connections can you make?
6. **Convenience** – what can you make more convenient? (shopping @ home)
7. **Boundaries** – can you extend or change the systems boundaries?
8. **Technology** – what technology would improve the MPM?

Figure 2 Creativity Triggers by Robertson

different steps called Dreamer, Critique, and Realist, respectively. Each of these steps would usually lead to prolonged sessions, which could easily need several hours. While the basic goals of these steps are well-defined, their detailed performance is hardly defined. Thus, no detailed guidance on their performance is given.

3. CONDUCTING THE CASE STUDY

Data could be gathered mostly on the deconstruction technique and the trigger list technique. As the application of the Walt-Disney technique was too limited with respect to time, we were not able to capture meaningful data on this technique.

Deconstruction technique.

The focus of this technique is to change preconceived assumptions of the participants. This is done by starting from things people are taking for granted wrt. to their situation. – In this case the system components and focus. – Then, successively pieces are removed and people are asked to name what the resulting things mean to them or how to replace the removed part.

During our session this technique did already provide quite some ideas people regarded as interesting. In total we counted 12 ideas (23 including variants). Out of these six ideas were regarded as new and five (of the six) were regarded as interesting enough to pursue them further. This amounts to roughly one successful idea for every seven minutes spent on the session.

Trigger List technique

We used here the trigger list by Robertson, there was no time for SCAMMPERR. The focus of the trigger list is mostly to see the problem different, e.g., by highlighting specific customer aspects (what better service might a customer expect?).

The results for this session were: 17 ideas generated (25 including variants). Out of those, five were regarded as new ideas and out of those again 4 were regarded as useful ideas.

SCAMMPERR

1-Substitute	Components, Materials, Persons
2-Combine	mix with additional functions or systems; add services
3-Adapt	change function, modify part of a different element, a building block or a subsystem
4-Magnify	enlarge enormously, add functions or additional capabilities
5-Modify	change scale, shape (colour, haptic, acoustic)
6-Put	„put to another use“ identify further usages or advantages, use it in a different context
7-Eliminate	delete elements, components, reduce core functionalities, simplify
8-Rearrange	change sequence, exchange subsystems, vary speed
9-Reverse	top-down, inside-out, reverse usage

Figure 3 SCAMMPERR Triggers

4. LESSONS LEARNED

The overall workshop session led to a large number of experiences despite its very restricted time-frame:

- Creativity techniques are always hard to apply; this was also illustrated in this case.
- Language and cultural problems can be a major obstacle in such projects.
- The fact that fundamental product ideas were sought probably helped to derive the large number of promising ideas
- It is necessary to distinguish different types of techniques, i.e., techniques that aim at providing ideas or approaches that support the whole creative development process (in one or more phases).
- Timing issues were a major concern during the whole workshop.
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5. CONCLUSIONS

In this paper we highlighted the result of a single workshop focused on creativity in requirements engineering. This workshop was particularly interesting as it was done in a situation, where new concepts for a product were already sought by the organization for quite some time. As a result it was actually surprising that additional ideas could be found at all. Even more than that, the workshop was extremely successful insofar as it allowed to generate a non-trivial number of new product concepts.

6. ACKNOWLEDGEMENTS

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