Success Factors for Creativity Workshops in RE

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Abstract. In today's economy, innovation is the key factor to remain competitive. However, due to the revolutionary and disruptive nature of innovations, it is apparent that traditional requirements engineering (RE) activities alone are not sufficient in this context (even though still highly important, of course). Rather, there is a strong need to enhance traditional RE activities with creativity techniques in a product or service development process. In the last seven years, we have supported several organizations from different domains in innovation finding during the RE phase. This paper presents our experiences from the creativity workshops we applied there, and it shows how such workshops can be integrated into RE processes. In this context, we list success factors that we observed and show the key ingredients of successful creativity workshops from our experience.

Keywords: RE, innovation, creativity, workshop, elicitation

1   Introduction

In today's economy, innovation is the key factor to remain competitive. Without having real innovations that inspire and bind customers, almost every organization can easily be replaced by other organizations that provide the same services and products with higher quality or lower prices.

However, innovation may not be mixed up with novelty. Adding a new feature to an existing product is typically an evolution but seldom an innovation. Real innovations change the way how customers experience a product, service or task in a certain domain, or they change the insights people can gain through it. Innovations therefore enhance the status quo and enable new benefits that did not exist there before.

At least in projects in which there is the need to have disruptive ideas, external inspirations, or a creative involvement of different stakeholder groups, it is therefore apparent that traditional requirements engineering (RE) activities alone are not sufficient (even though still highly important, of course). This means that, in such a context, merely eliciting expectations and requirements from the stakeholders, or analyzing their problems and frustrations will probably not lead to a solution that is needed for changing this domain sustainably. The often cited statement from Henry

Ford, i.e., "if I had asked people what they wanted, they would have said faster horses" is therefore still valid today.

Thus, at least under the aforementioned circumstances, there is a strong need to enhance traditional RE activities with creativity techniques in a product or service development process. However, we claim that doing a brainstorming [1] or another creativity technique in isolation is not sufficient for systematically elaborating innovative ideas. Rather, creativity is a hard work, which needs clear guidance in a relaxed atmosphere, even though everyone can basically be more creative than he or she thinks.

In the last seven years, we have supported several organizations from different domains in innovation finding during the RE phase. This paper presents our experiences from the creativity workshops we applied there, and it shows how such workshops can be integrated into RE processes. In this context, we argue that many things during such a workshop can go wrong if not carefully anticipated. Thus, we list the good and bad things we observed during our creativity workshops and we highlight the need for an excellent preparation, moderation and rework that we consider as indispensable for coming up with really beneficial results. Based on this, we also explain how the workshop results can be processed further in order to transfer initial ideas into concrete requirements.

As we have already presented a first set of 12 success factors at CREARE 2010 [1], this paper will re-discuss these factors based on our additional experience we have made since then. Further, new, essential success factors will be presented in this paper. This is especially important as the creativity workshops we reported on in our CREARE paper were almost all in research project settings, while our recent creativity workshops have all taken place in the context of industry projects.

The remainder of this paper is structured as follows. In section II, we describe the projects in which we did a creativity workshop during RE in the past and we summarize their contexts and goals. In this context, we elaborate the success factors of these workshops and also present a re-discussion of the factors presented in our previous publication [1]. In section III, related work in the area of creativity workshops is briefly considered while section IV concludes.

2   Success Factors

Table 1 lists nine creativity workshops we performed over the last few years (i.e., since our CREARE paper from 2010) in RE processes including their goals, results, context characteristics and participants.

In the following, we will share our insights from this series of creativity workshops from two perspectives: first, we present new success factors that we learned during these workshops. Second, we discuss the already existing lessons learned reported in our previous CREARE paper under the light of the new projects reported in Table 1 for showing which success factors were confirmed or which new insights we received.

Project Characteristics	P1	P2	P3	P4	P5
Domain	ICT: Business Intelligence	Insurance: Mobile Business Apps	ICT: IT Product (HW & SW)	ICT: IT Product (HW & SW)	Agricultural Engineering: Product & Service
Workshop Goal	Interaction Concepts and Feature Ideas for a given Product Idea	Mobile Business App Ideas (B2E & B2C)	Product Ideas that can be developed in less than 3 Years	Product Ideas that can be developed in less than 3 Years	Product or Service Ideas for the next 3-5 Years that utilize the latest IT Trends
Desired Workshop Result Quantity	Medium: For 3 given Product Feature Areas a small Number of competing Ideas each	High: As many App Ideas as possible; Participants should mark their favorites	Low: Exactly 2 Product Ideas	Low: Exactly 2 Product Ideas	High: As many Product, or Service Ideas as possible; Participants should mark their favorites
esired Workshop Result Fidelity	Medium: The Results have to enable Product Design to create a coherent Interaction Design for the given Product Idea	Low: The Results have to enable Management to decide which Idea clusters should be investigated in more detail	High: The Results have to enable Product Management to directly create a Business Plan	High: The Results have to enable Product Management to directly create a Business Plan	Medium: The Results have to enable Management create a prioritized Development /Execution Plan for the Ideas
Desired Degree of Innovation	Medium: It should be possible to implement the ideas in 1 Year with a team of 7	Medium: It should be possible to implement the ideas within 1 Year with a Team of 7	High & Low: 1 very innovative ("crazy") Idea, 1 low innovative ("normal") Idea; It should be possible to implement the Idea in 3 Years with a Team of 100	High: It should be possible to implement the Idea in 3 Years with a Team of 100	Low-Medium: It should be possible to implement some Ideas directly and some over the next 1-5 Years
Starting Basis / Input Material	Intense Interviews with the Client about the given Product Idea, Goals of the Workshop, User Stories, Initial Wireframes	Small List of potential App Ideas derived by the Client, Short List of existing Insurance Apps, Goals of the Workshop	Intense Interviews of the current Roadmap of the Client, Documentation about the current Roadmap, List of Areas of Improvement, Product Ideas derived by the Moderators' company, Goals of the Workshop	Description of the Business Domains of interest, Description of the current Roadmap	Short Interviews to derive the Goals of the Workshop, Examples to illustrate current ICT Trends
Duration	1.5 Days (Start 1st Day in the Morning)	1 Day (Start in the Morning)	1.5 Day (Start 1st Day in the Afternoon)	2 Days (Start 1st Day in the Morning)	1.5 Day (Start 1st Day in the Afternoon)
Number of Participants	9	14	9	10	15
Background of Participants	Business Experts, End-Users, Product Managers, Developers	Business Experts, Product Managers, Developers	Business Experts, Product Managers, Top-Level CEO, Developers	Business Experts, Product Managers, Developers, Usability Expert	Business Experts, End-Users, Product Managers, CEO, Developers
Number of Moderators	3	2	2	2	2
Environment / Location	Neutral Location	Neutral Location	Neutral Location	Client	Client
Briefing of Participants	Very little; E-Mail by the Client	Very little; E-Mail by the Client	Very little; Verbal by the Client	Extensive; Verbal and E-Mail by the Client	Very little; Verbal by the Client

Table 1. Comparison of the different workshops

Project Characteristics	P6	P7	P8	P9
Domain	Fashion: Big Data / Marketing	Fashion: Big Data / Marketing	Insurance: Mobile Business Apps	Finance: Mobile Business Apps
Workshop Goal	Usage Scenarios in Product Marketing that utilize Big Data Technology	Usage Scenarios in Product Marketing that utilize Big Data Technology	Mobile Business App Ideas with Focus on Context Awareness	Mobile Business App Ideas (B2E & B2C)
Desired Workshop Result Quantity	Low: 1-2 concrete Usage Scenarios	Low: 1-2 concrete Usage Scenarios	Medium: 6 App Ideas	Low & High: As many App Ideas as possible; 3 App should be described in more Detail
Desired Workshop Result Fidelity	High: The Results have to enable the IT Department to find and combine the required data sources and enable them to select appropriate Big Data Technology	High: The Results have to enable the IT Department to find and combine the required data sources and enable them to select appropriate Big Data Technology	Low: The Results have to enable Management to decide on Intensification of Effort in the Area of Mobile Business Apps	Medium: The Results have to enable Management create a prioritized Development /Execution Plan for the Ideas
Desired Degree of Innovation	Low: It should be possible to implement the Ideas directly in the next 6 Month	Low: It should be possible to implement the Ideas directly in the next 6 Month	Medium-High: It should be possible to implement some Ideas directly and some over the next 1-5 Years	Low-Medium: It should be possible to implement some Ideas directly and some over the next 1-5 Years
Starting Basis / Input Material	Use Cases, several Interviews with Business Experts to elicit the As-IS-Situation as well as first Ideas, Goals of the Workshop	Use Cases, several Interviews with Business Experts to elicit the As-IS-Situation as well as first Ideas, Goals of the Workshop	Short Interviews to derive the Goals of the Workshop, Examples to illustrate current ICT Trends	Use Cases, several Interviews with Business Experts to elicit the As-IS-Situation as well as first Ideas, Goals of the Workshop, List of Areas of Improvement, Detailed Documentation of 2 main Use Cases, Examples to illustrate current ICT Trends
Duration	0,5 Days (Start in the Afternoon)	0,5 Days (Start in the Morning)	0,5 Days (Start after Lunch)	2 Days (Start 1st Day in the Morning)
Number of Participants	7	7	12	13
Background of Participants	Marketing Experts, Developers, Big Data Experts, IT Service Experts	Marketing Experts, Developers, Big Data Experts, IT Service Experts	Business Experts, Product Managers, Mid-Level Management, Sales Experts, IT Service Experts	Business Experts, Product Managers, Top-Level Management, Sales Experts, IT Service Experts
Number of Moderators	2	2	2	2
Environment / Location	Client	Client	Client	Neutral Location
Briefing of Participants	Very little; Verbal by the Client	Very little; Verbal by the Client	Very little; Verbal by the Client	2 Participants: Extensive; Verbal and E-Mail as requested by the Client. Others: Very little; E-Mail by the Client

Table 1 (continued). Comparison of the different workshops

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2.1   New Success Factors

As the first new success factor, we consider having six key ingredients (participants' roles) in each creativity workshop. First, an idea generator with a domain (not technical) perspective is needed to generate unusual ideas in the workshop. As a kind of pendant, we need as second role an idea evaluator with a technical perspective in order to estimate feasibility and needed effort for the evaluation phase. Third, we need an idea generator with a technical perspective to produce innovative ideas based on technical innovation potential. As a pendant for this person, we need as fourth role the idea evaluator with a domain perspective that can judge whether a technology-driven idea would be accepted by the domain and what would be the impact. The fifth and sixth role are the moderators of the workshop. Both moderators should be skilled in creativity techniques and also moderation. We differentiate the moderators in the analytical moderator and the motivating moderator. The motivating moderator continuously guides the participants through the workshop and motivates them to contribute actively. By his behavior he encourages the participants to contribute continuously to reduce their shyness. The analytical moderator keeps a close eye on the meta-level on the one side and the results of the creativity techniques on the other side. In case he or she realizes a problem on the meta-level (like participants getting into too intense discussions) or on the result level (output completely different than expected), the analytical moderator interrupts the workshop and re-plans the workshop in a coffee break.

A second new success factor we learned is starting with the collection of negative "ideas" at the beginning of a creativity workshop instead of starting with positive ones. The reason is that the human nature seems to be much more productive if we ask for negative aspects than if we ask for positive ones. One can use this simple mechanism in RE within creativity techniques. Thus, we made very positive experience using the so called FlipFlop technique if we want to get many ideas. This means that instead of gathering ideas for a question like "how can we make sure that our new feature will be successful in the market?" we ask for "how can we make sure that our new feature will be completely unsuccessful in the market?" In our experience, asking like this, will lead to more than double the answers compared to the first, positive version of the question. Of course, we then have to reverse the statements so that the contrary (being successful) can be used for further processing.

2.2   Re-Discussing Existing Success Factors

In the following, we present new insights for seven out of the 12 success factors that we reported already at CREARE [1].

Regarding the success factor of "Prepare the convergence step carefully, plan breaks" and "Don't oversimplify the prioritization and evaluation step" we would like to emphasize now also the explicit need for intermediate prioritization steps during a creativity workshop, and not only the need for a final evaluation at the end. Especially when time is rare to elaborate each intermediate idea in detail, divergence and

convergence need to be used alternately. However, as such intermediate prioritizations may quickly end up in time-consuming discussions (e.g., "all ideas are important!"), we made very positive experience with forcing the participants to "select the idea that you like most" in a "first come, first serve" setting.

Regarding the success factor of "Plan enough time" and "Atmosphere" we emphasized that a good (and different) environment and enough time is indispensable for running these workshops. In particular, we experienced that approximately 1.5 days of concentrated work are usually needed for coming up with fruitful results. We also realized that it is extremely important that the participants participate continuously, and that they should not be distracted by emails or parallel meetings. Thus, in the meantime we even tend to postpone or even cancel creativity workshops, if the probability is high that participants have to leave, or if the organizational surrounding conditions are not good enough to work in a creative atmosphere (e.g., no willingness to move to a different location).

In our previous CREARE paper, we also emphasized the need to use even not very well-known "Creativity techniques to enforce variations" even though people might be sceptic if we use something beyond the classic brainstorming. We can clearly confirm that we came to many settings where classical brainstorming style techniques have been used with no or very limited success, and that different techniques created much more innovative ideas. However, we learned in the meantime that there is no strong need for making use of too many different techniques and that it is not needed to always (re-) select from the over 200 existing creativity techniques that are out there. Rather, we recommend adhering to an individual set of techniques with which the moderators have made good experience and which work well in their individual context. In the different projects we conducted so far (cf. Table 1), we always used, similar set of techniques, always with very positive results.

When we reported our lesson "Never start without prior analysis of the problem space in the domain", we wanted to emphasize that we strongly recommend performing domain, market, problem and requirements analyses beforehand. However, we would like to extend this success factor with our observation that even for moderators that did many creativity workshops in the past, a thorough and detailed planning of each individual workshop is still indispensable. In particular, the creation of a dedicated, detailed script for the moderators explaining, for instance, how the results of one technique are processed by a subsequent technique, the anticipation of results of each techniques (sometimes with trial runs) and the intensive discussion of the analytic and motivating steps in the preparation of the event is needed. In addition, it is essential for the perception of success that the participants experience a logical connection between the results of each step of the creativity workshop.

In CREARE, we also reported that one should "Choose participants carefully", arguing that one should not invite the narrow minded fellows to the workshops for not letting them slow down the creative group process. As can be seen from the new success factor of "six key ingredients for successful creativity workshops", we relativized our opinion on this. Of course, we still have to choose the participants carefully, but also with regard to the mix of persons. In addition, we want to emphasize how essential it is to use "evangelists", i.e., persons that participated in

such events and can positively affect other people experiencing this the first time. Second, we always experienced having interdisciplinary in such sessions as a key success factor. In particular, involving a real customer in the process of product innovation is always a win for both sites. We experienced that customers felt a higher loyalty when they are invited to participating in product development. Of course, this involves the risk of disappointing the customers, if no ideas are implemented.

Finally, we also want to comment briefly on the other five success factors that we reported in our former CREARE paper [1]. The factors "Don't start too late in a project" and "Contact people personally beforehand and clarify expectations and goals" are of course still valid, even though we achieved very good results also when not always contacting the people personally before.

When we reported the success factor "Have fun, but not too much" we argued for finding the right balance between enjoyable time and making clear to the participants that everybody must work hard on the ideas to make the workshop a success. We made good experience with keeping this always in mind.

Also "Include good Incubation" is very valid. We often experience in the new projects that the incubation phase can have significant impact on the generated ideas.

In the new projects, we did not stick much to the factor "Don´t rotate participants unless there is enough time". We also made good experience with mixing teams, even though one needs to keep in mind that a group of people needs some time to find together to become effective. In this regard, we made good experience with "force fit" in which persons with different backgrounds have to combine different ideas.

3   Related Work

Several further authors reported also their experiences on creativity workshops. Geschka [2] reports on several benefits of creativity in RE in comparison to individual problem solving, especially an increased effectiveness with higher amounts of new ideas at lower costs.

Maiden et al. [3] report their lessons learned, for instance, that one-day workshops are too short, restricting the time to develop trust and collaboration among employees as well as the time to incubate and illuminate ideas too much. Furthermore, they report the necessity to define clear input and output models for each half-day session.

Gryskiewicz et al. [4] describe lessons learned from the participants of the creative RE project, mainly concerned with group dynamics. Additionally, they recommend discussing problems in a group of people with different backgrounds, not only with experts of the domain.

Rhodes and Thame [5] give recommendations for the performance of workshops to speed up the process of innovation in organizations. The type of workshop they present is claimed to be suitable for the identification of market chances of the organization and the creation of new product / market concepts.

Anderson [6] describes experiences from the perspective of a workshop participant as well as of a workshop leader. He presents some suggestions to improve the performance of creativity workshops: For example he recommends the participants to arrive in the workshop already with prepared ideas.

Schlosser et al. [7] contains an extensive description of the workshop and a collection of "creativity triggers" with specific explanations and examples they defined for the context of the project to enable creative thinking during the workshop. Because of the usage of a creativity workshop, they authors experienced an increased efficiency of the requirements elicitation.

Mahaux et al. [8] report in general on what creativity can mean to different persons in RE and, therefore, give a good foundation for creativity in RE.

4   *Conclusion*

We argued that in today's economy, innovation is the key factor to remain competitive. Therefore, including innovation into the RE activities by means of creativity workshops is key to success. This paper extends a previous report on success factors when performing creativity workshops [1]. We report on experience from conducting creativity workshops in new, purely industrial projects and discuss and extend success factors that were reported previously [1]. As part of this, we present the six key ingredients for performing creativity workshops successfully. We hope that sharing these experiences enables other researchers and practitioners to perform creativity workshops more successfully and motivates people to extend research on creativity in RE, respectively.

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