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## Conceptualizing Ideation Workshops for SMEs

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### Abstract

An external ideation space seems to be a promising way to support SMEs in ideating new products and services. This paper addresses the question ‘how to operationalize important working principles in the fuzzy front end of product development for ideation workshops with SMEs, aiming at ideating new products and services?’ Based on the principles of user-centred design, iterative prototyping, as well as the SMEs’ need to take home the workshop outcome, we propose an ideation workshop concept, apply the concept in four workshops with different companies, and analyse it by triangulation of protocols, recordings, and interviews with the SMEs’ CEOs.

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*Keywords:* Ideation; Workshop Concept; Iteration; Prototyping; Testing

### 1. Introduction

It is relatively easy for companies to insure themselves against risks such as litigation or a damage caused by storm. However, the risk of a lack of innovation cannot be insured, neither for launching new products too late on the market. In recent years, product life cycles continue to shorten and the global pressure on innovations keeps rising. Big companies can afford investing into think tanks and specific creativity departments to develop new products within both, a very short lead time and a high degree of innovativeness. Contrary, even leading niche small and medium-sized enterprises (SMEs), which are often embedded in their local environment, cannot afford to do the same as resources are just not sufficient.

One potential solution is an external ideation space complemented by coaching and bookable for a few days, in order to support SMEs in ideating new concepts for products and services. However, as we discovered, even booking an ideation workshop requires high commitment by the SMEs, as their opportunity costs are essential for their businesses.

In Switzerland, the first ideation space of this kind has opened its doors recently. It is located in a refurbished medieval castle on a hill, close to the city centre of Thun, comprising seven rooms and the environment of the castle

itself. The establishment of the ideation space and the running of ideation workshops are elements of a research project, aiming at investigating the impact of iterations in the fuzzy front end of SMEs’ product development processes (PDPs) on their innovation capability. The progress of the research project, and results from preliminary workshops have been described by Heck et al [1] and Al-Falou et al [2].

Based on these results, this paper aims at investigating important principles for ideation workshops with SMEs, and at formulating a workshop concept incorporating and operationalizing these principles. Thus, our guiding research question is: *How to operationalize important working principles in the fuzzy front end of product development for ideation workshops with SMEs, aiming at ideating new products and services?* The answer will contribute to forthcoming workshops and research about iterations in PDPs.

The remainder of this paper is organised as follows: Section 2 overviews working principles in the fuzzy front end of PDPs. Based on these principles, section 3 outlines a concept for ideation workshops with SMEs. This concept is applied in four workshops, as described in section 4. The results are summarised in section 5 and discussed in section 6. Section 7 concludes.

## 2. Working principles in the fuzzy front end of PDPs

This section provides the basis for the concept of ideation workshops by reviewing literature regarding user-centred design, iterative prototyping, as well as the need to take the big idea home tangibly.

### 2.1. User-centred design

“One of the core design thinking principles is user-centric design” [3]. It demands thorough need finding methods and requires development teams to test iterative prototypes directly on users, whenever possible. Identifying the ‘real’ user among several stakeholders is a difficult challenge [3].

The statement “All design activity is ultimately social in nature. Never go hunting alone” [4] indicates that on the one hand the product should fulfil human needs, and on the other hand the design process is a social endeavour, involving several individuals.

### 2.2. Iterative Prototyping

Prototyping can be broadly linked to the purposes of (1) evaluation and testing; (2) the understanding of user experience, needs, and values; (3) idea generation; and (4) communication among designers [5]. Their degree of maturity may vary with different materials such as paper prototypes as low fidelity prototypes or 3D-printed prototypes as high-fidelity ones, even though these attempts focus on evaluation rather than the support of design exploration [5]. Nevertheless, there is a supportive positive correlation between comprehensive testing and shorter product development time [6]. Moreover, parallel prototyping leads to better design results, while it reduces the development time further [7].

Regarding idea generation and evaluation, prototypes may also support the two different kinds of ‘divergent’ and ‘convergent’ thinking: Divergent thinking is “thinking that moves away in diverging directions so as to involve a variety of aspects and which sometimes lead to novel ideas and solutions; associated with creativity.” Convergent thinking is “thinking that brings together information focused on solving a problem” [8]. These definitions fit to the distinction between associative thought and analytic thought [9], or lateral and vertical transformations in thinking [10]. Although more research has been done about divergent thinking in creativity (which is necessary for idea generation, i.e. ideation), today it is widely accepted that creativity consists of divergent thinking and convergent thinking. Dow et al [11] found that sharing multiple designs improves exploration, group rapport and results during prototyping sessions, i.e. divergent and convergent working phases.

Both modes of thinking can be embedded in an iterative cycle for the execution of experiments, i.e. (1) design: one conceives of or designs an experiment, (2) build: one builds the physical or virtual apparatus/prototype needed to conduct the experiment, (3) run: one runs the experiment, and (4) analyse: one analyses the result. As experimentation is usually a matter of repeated trial and error, one modifies the design as long as the analysis shows that the quality can be improved

cost-effectively [12]. Ballard [13] and Le et al [14] describe positive and negative iterations in design. In this context, early prototyping and testing seem promising approaches to discover so-called ‘unknown unknowns’ [15], [16] (i.e. problems or opportunities which might cause iterations) as early as possible, and to learn about user needs, the product and its production process, in order to avoid costly pitfalls. Skogstad and Leifer [17] recommend designers to maximize the probability of gaining insights by experimenting with many ideas using simple prototypes, and managers to let designers experiment instead of censoring untested ideas. Nevertheless, iteration can also be conceptualized as exploration, convergence, negotiation, rework, refinement, and repetition, even if these perspectives are indeed different but non-orthogonal [18]. However, design teams should aim at eliminating rework iterations and at performing design iterations without skipping of abstraction levels, as well as doing behavioural iterations in parallel [19].

### 2.3. Taking it home

Companies calculate with the expenses they have to pay for sending employees to an ideation workshop as well as the opportunity costs of work not done and lost sales. Thus, they want to know in advance what can be expected from an ideation workshop. Especially for transferring the elaborated ideas back into the company, participants want to actually carry their embodied ideas and functional prototypes home. This tangible product allows them to share their experience with colleagues and increases the potential of convince others for their new ideas [1].

When people are creating ideas, they become excited, take ownership and make commitments. They try to ensure that the concept can become reality. Thus, the team should gather the embodied idea and all the evidence discovered during the workshop and take it on home. Make it real. Plan, allocate resources, and involve all necessary corporate functions [20].

Based on the considerations outlined above, we have established the hypothesis that user-centred design, iterative prototyping, and taking the big idea home are necessary working principles for ideation workshops with SMEs.

## 3. Concept for ideation workshops with SMEs

This section describes the concept for ideation workshops with SMEs based on the working principles elaborated in the former section. The concept consists of 3 phases, aiming

- first at identifying the ‘right’ questions by putting the user’s needs at centre stage, i.e. creating a shared understanding of a topic, and enabling a goal-oriented working. This also incorporates scrutinising conventions,
- second at identifying promising answers/solutions to these needs by an iterative learning process, i.e. ideation, prototyping and testing, in multi-disciplinary teams, and
- third at getting things done by preparing the SMEs’ next steps for implementing these solutions and calling attention to changes in the SME based on the workshop outcome. A tangible product vision supports defining priorities.

We found in [1] that 2.5 days for such workshops are a good balance between having enough time for generating good results on the one hand, and on the other hand not to consume more SME resources than necessary. Hence, each of the three phases can be allocated to one day.

### 3.1. Identifying the 'right' questions

In order to ease all participants and to enable the moderator to respond to their specific needs, the workshop introduction comprises information about space, process, the request to put their mobiles into flight-mode, and a personal introduction of all participants including their motivation and expectations. Simple name-tags for everyone support the communication between people who meet for the first time.

To free the minds of all participants and to prime them with a common mind set for the (at least) next 2.5 days, we start with a short 'design challenge' and let them share a personal anecdote to the following key words:

- Allow oneself room for sth. (spatiotemporal and mentally)
- Work in multidisciplinary teams
- Focus on the user and his/her needs
- Generate ideas first, evaluate them later on
- Iterate fast, often and cheap
- Experiment with different approaches
- Put ideas across tangibly
- Borrow ideas of others and develop them further
- Ask questions
- Seize feedback for learning
- Enjoy dancing with ambiguity

To get the participants started, to collect their spontaneous ideas about the workshop topic, and to give them a space to get rid of possible concerns regarding the topic, we let them write down their thoughts on brown paper. We call that 'brain dumping'.

A short reflection session enables the moderator to highlight important points and to lead over to the enumeration of all involved parties in this topic. The emerging list will be clustered, consolidated, and visually organized, resulting in a 'stakeholder map'.

This map will be utilized to point out users of current products/services, potential users of forthcoming products, and desirable users of products which do not exist so far. This overview over a wide range of users facilitates for the participants to identify groups of important users with a big potential for the company. If there are enough participants to separate them in small teams (of 3-5 people), we allow them to also choose one user for whom it is just fun to develop a new product.

So far, the participants worked individually or in the group of all participants respectively. After having decided for two or more (groups of) users to work for, the participants split up in small teams consisting of 3-5 people. These teams each work on one user in order to identify his or her individual needs. Thus, the teams explore the user's professional and social environment, its habits, wishes, dreams and problems, and summaries these information in a 'persona' [21].

Second, the teams are encouraged to gain 'empathy' with their personas and to see/understand the world as he or she would do. They get into the role of their personas by introducing him or her to the other teams in a short role play in the style of "Hi, I'm Bob, the 43-year old father of Mike and Jane,..." Afterwards, the other teams ask questions and give feedback regarding the consistency and vividness of the persona description/introduction.

Third, as we are aiming at identifying user needs, the teams work on the 'user journey' of their personas when he or she would use a current product/service. What are disadvantages, problems, drawbacks or workarounds? Are there unsatisfied user needs? We collect all these issues in a list of 'pain points' and determine the most critical ones.

Last, each team shall focus on the root cause of the most critical pain point of their persona. Is that cause identified, e.g. by applying the '5 why'-method or an Ishikawa-diagram, and based on all the work done so far, the teams each formulate one question on 'how to' solve this issue. We call this last task in this phase 'reframing the topic', resulting in asking the 'right' questions.

### 3.2. Identifying promising solutions

There might be uncountable answers/solutions to the questions raised at the end of the former workshop phase. In order to identify promising ones, (1) the solution space shall be explored as broad as possible ('divergent mode'), and (2) promising solutions shall be found by prototyping, testing, and refinement ('convergent mode').

To give the participants an impression of the working in this divergent mode, we start with a short warm-up exercise aiming at letting them experience the domino effect of idea generation in teams. Based on that, the teams begin their 'ideation journey' and brainstorm as many ideas and solutions to their specific question as possible, collecting them as key words or scribbles on post-its. In this mode, the teams are asked just to produce, not to discuss or evaluate their findings.

Before the teams present their findings, and thus, switch the first time to the convergent mode, we advise them at seizing the following feedback for learning, and thus to keep two things in mind: first, these presenting-feedback-sessions shall be short and precise, and second, discouraging discussions among participants shall be avoided. Therefore, we structure the feedback by introducing different feedback roles, embodied with tangible tools. The first four tools are worn/held by the participants who give feedback, the last tool is for the presenting team:

- Goggles represent the users point of view, and remember to focus on the user's needs.
- A red heart allows to bringing in what the participant likes and wishes personally.
- A hard hat invites to build on the feedback, and to develop the constructively formulated thoughts further.
- A rubber mallet announces concerns regarding the presented ideas in terms of feasibility.
- Tape (holding in hands, not sealing their lips) remembers the presenting team to pipe down, to listen and to reflect.

With the first feedback in mind, teams switch back to the divergent mode. Depending on their pace or struggles, we introduce them to concepts such as ‘powers of ten’, ‘thinking in analogies’, ‘collaborative sketching’ or ‘inverting the question’. If they are lacking some information, they can use iPads for searching the web. If they need more input or feedback from different people, they are encouraged to interview tourists on the castle hill (mostly Americans or people from Asia), or meet some locals in the city centre. If they want to embody their ideas in tangible prototypes, they are invited to use a variety of materials and tools in the soft-prototyping space, called ‘Atelier’. There, the materials are presented inspiringly in transparent boxes and open storage racks, and all tools are in reaching distance to the working benches. Later on, if their ideas are more concrete, they can also use hard-prototyping machines such as a mitre saw, a drilling machine, an industrial sewing machine, or a laser cutter in the ‘Machine shop’.

During this workshop phase, the teams alternate between the divergent and convergent working modes, i.e. they generate ideas and build prototypes, and test these interim results in presentations throughout the day. The feedback-sessions might be turning points for adjusting their ideas based on the input of the other participants.

At the end of this workshop phase, the teams shall have a clear understanding of their personas’ needs and the products’ features that satisfy these needs. Moreover, they should be able to communicate these ideas in a convincing way. Thus, the teams are encouraged to produce a play/pitch/presentation in a view to public appeal on stage. It shall address the ‘why, how, and what’ (in this order) [22] of their visions and therefore comprise a situation with the personas’ need appearance, the product application and the resulting benefits for the persona. Being able to tell these coherent stories, the teams are convinced having identified promising solutions.

### 3.3. Getting things done

According to the saying “an idea is only as good as its implementation”, the last phase aims at preparing the SMEs’ next steps for implementing the generated results and at directing attention to possible changes in the SME’s organisation based on the workshop. Therefore, the teams need first to envision what they want to achieve within the next year (e.g. to file a patent, to present the product on a trade fair, or to launch it on the market), and second, to plan the next steps for the organisation in order to do so.

We support the envision of the within-a-year achievements by letting the teams write a newspaper article (on the iPads), consisting of a catchy headline, a short teaser, and a picture of their final prototype, in a manipulated cover-page template of a famous Swiss newspaper. In order to create commitment among the team members, the articles get a time-stamp, i.e. are dated on the workshop date in the following year.

The close collaboration of all participants during the last two days facilitates a good understanding about the individual mind sets and the different roles within the organisation, and enables the participants to better overview the whole product development process. With this overview on the one hand,

and with having entered into the commitment of the newspaper article on the other hand, it is relatively easy for the participants to deduce the next steps in the PDP.

Besides the results for the organisation (the product ideas and the plan how to develop them further), the workshop might also have induced some insights for the participants. To become aware of these insights and to foster them, we conduct a reflection session, comprising the questions:

- What will I take home for me (what did I learn)?
- What will I take home for the company (e.g. the product ideas, the implementation plan, new methods, skills, ...)?
- What should the workshop team think about (feedback)?

Finally, the participants are given the opportunity to take photos of all interim results and to collect their prototypes for taking home. They might support convincing their colleagues, conducting the next steps, and getting the things done.

## 4. Workshop execution and data gathering

This section summarises how we prepared and conducted four ideation workshops with different organisations, and describes how we gathered the data to test our hypothesis.

### 4.1. Preparation of the ideation workshops

Prior to the workshop, the moderator and the SME’s CEO need to create mutual understanding and confidence, manage expectations, and enable convincing workshop results. They have to figure out whether the workshop concept is appropriate to the SME’s situation and goals, and whether the requirements for participation are fulfilled (i.e. is there the willingness to scrutinize the status quo and to act upon that?). Being aware of the rough workshop progress and the variety of outcomes (e.g. new product ideas, learning of skills, and a creative competence [1]) facilitates an estimation about the potential impact of the workshop on the SME’s innovation capabilities. In addition to that – and of strategic importance to the SME – is the definition of the ‘workshop topic’ as starting point of the ideation journey. As the participants generate all results, the staffing should ensure heterogeneity regarding experience, represented functions and age of the participants. The CEO’s attendance during the workshop is prerequisite, as he or she acts as a sponsor with budget and implementation competences afterwards. All these issues were discussed in briefings prior to the workshops.

### 4.2. Execution of the four ideation workshops

We observed four workshops, each with a different organisation: three SMEs with about 100-500 staff that are producing equipment for households and offices, and a businesswoman who identified a need on public events and brought together seven freelancers and business partners. Thus, 8-16 participants (representing different business areas such as marketing, R&D, production, sales,...) worked together for 2-3 days, guided by 1-2 (out of 3) moderators with experience as industrial designer, entrepreneur and



innovation manager, and a management consultancy's CEO, respectively.

In two workshops, we included a short exercise: All participants were asked to form a line in order of their represented functions in the SME's PDP, without being allowed to communicate with each other. Afterwards, we told them a story (called 'the harbour master', based on the theory of constraints), pointing out that collaboration has advantages over a pronounced departmental thinking ('silo-thinking').

#### 4.3. Data gathering and triangulation

During the ideation workshops, we wrote a time log (35pages) including observations based on the AEIOU-framework (Activity, Environment, Interaction, Object, and User) [23]. Additionally, we filmed the participants' presentations and took photos during their working sessions. We collected the qualitative feedback of all participants directly after the workshops, and conducted semi-structured interviews with the CEOs a few weeks afterwards, investigating the impact of the workshop on the organisation. Triangulating the data leads to the following results.

### 5. Results

The results are presented in three sections: first, the workshop progresses are summarised and key events highlighted, second, the participants' feedback is summarised, and third, the feedback of the CEOs indicate the workshop's impact onto their organisations.

#### 5.1. Workshop progresses and key events

All workshops followed roughly the above described concept, even though there were deviations in the time consumption for single tasks. As we split the participants in small teams, they sometimes worked on different tasks when one team was faster than another. But allowing these differences was appreciated as 'individualised moderation'.

At the end of the first phase, some teams were satisfied to know 'what they are looking for' in the next phase. This emotional state was a convenient moment to finish the working day, and to start the next phase on the following day. However, this was not possible in all cases, as one workshop started in the afternoon (and 3-4 hours would have been too short for the first phase), and another workshop was (due to the human resource availability within the SME) compressed into 2 days. In general, the emotional state of the participants varied throughout the workshop progression, also influenced by the amount and duration of breaks, the provided food, and the mastering of the tasks (e.g. the frustration of having a 'real problem' after frankly scrutinising the status quo). During the second phase, mostly in the afternoon of the second workshop day, when the teams had found approaches to solve their problems/answers to their questions, and were building prototypes to communicate their ideas and to learn from the feedback of the other participants, some teams got into flow while working.

#### 5.2. Participants' feedback directly afterwards

Besides general praise and amazement about how fast they developed creative ideas, participants positively pointed out the moderation/coaching (well structured, spontaneous, flexible, and competent), and highlighted the positive team dynamics during the 2-3 days. Also the space itself is noticed positively.

More in detail, the participants reflected the workshops' progress, the iterative approach, and the prototyping. They did not think that they could realise new product ideas and prototypes that quickly and easily. One said: "If you have been in the wrong direction – so what – after an hour you are back on track!" Furthermore, the user-centred approach, the positive mind set ("think in chances, not in risks"), the why-how-what concept, and the discussion about the 'emotional curve' helped them and will be taken home.

#### 5.3. CEOs' evaluation and workshop impact onto the SMEs

CEO1: The workshop exceeded the expectations of all participants. During the prototyping sessions on the second day, the participants were truly in a state of flow. Due to the positive spirit evolved, they want to adopt some methods such as radical user-centred design, high-speed iteration cycles, lean-prototyping, and the structured feedback. Additionally, they want to integrate a prototyping room on their site in their PDP. The envisioned products will be developed further – the next milestones are already nailed down. Recently (five months after the workshop), we received an email, that they are using their prototyping room quite frequently, and that they will conduct an ideation workshop with an Italian company of several days' duration.

CEO2: The expectation management didn't work that well – he was not aware that the workshop would only comprise the idea generation for new products, and not elaborate their PDP, discovering potentials and suggesting best practice for improvement. During the workshop, the iterations were a bit too fast. Theory-inputs should be short and more 'applied'. The participants were not used to give and receive feedback, therefore the feedback roles were not that much accepted. Nevertheless, the atelier and machine room were a "paradise", and all participants appreciated to experience achieving results faster by working together. Therefore, the story of 'the harbour master' was very important. Taking all into account, he would like to repeat the workshop in one day at the SME's site, and believes in two of four product ideas that will be developed further.

CEO3: Six weeks after the workshop, the product ideas were presented to the management board and received a go-decision for the standard product development process. Furthermore, one idea shall be staged on an important industrial fair in about a year to stud their vision with their brand. Within the company, the workshop participants presented their workshop experiences and learnings to their colleagues, and also on a personal note they seem happy. The CEO states for himself: "For me, it was a great time, I also learned a lot. And I am grateful that we could participate." Moreover, he recommended the ideation workshops at Thun castle to another company he is in close connection with.

## 6. Discussion

So far, our results base on only four workshops. However, we can state that the briefings prior to the workshops are necessary for the expectation management, topic definition and participants selection. The data triangulation from observations, visual data such as movies and photos, as well as the feedback of participants and CEOs was appropriate for this qualitative research. In the long run, we will be able to conduct up to 30 workshops/year (i.e. experiments) which will also require adapted data acquisition. By then, we can derive research insights from hard data of a large data set.

Regarding the stated hypothesis, the applied workshop concept enables participants to focus on user needs, facilitates exploring and testing product ideas and simple tangible prototypes, and prepares the further development of the product ideas within the company. Thus, the workshops concept can be utilised for conducting experiments regarding the overall research interest about iterations in PDPs.

The following potential research questions emerged and might be addressed in future: Which impact do iterations have in ideation workshops, and which impact do they have within the PDP of SMEs? What happens if all business areas work together in the fuzzy front end of PDP, and how is the PDP performance influenced by several teams working on a topic at the same time? What drives the group dynamics in an ideation workshop, and how effective is the skill training of the design thinking methods for further application in the SME? Can one measure different emotional states? How to measure flow and how to influence/increase it? What is the relationship between testing and feedback, and what impact has the structured feedback (what is the most promising combination of different roles)? Furthermore, the research project will investigate the innovation capability of SMEs before and after participating in an ideation workshop to measure the impact of such an intervention.

## 7. Conclusion

The data triangulation allows us to address the research question appropriately. The workshop concept operationalises important working principles in the fuzzy front end of product development. The case studies enabled us to further improve the workshop concept and to generate and refine further research questions and hypotheses that will be tested in forthcoming workshops.

The next steps in the research project are: As soon as the medieval castle is refurbished, we will further adapt our workshop and interior design concept. Moreover, several measurement tools will be tested against their usefulness regarding our research interests such as the impact of short iteration cycles in the fuzzy front end of product development.

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