

## Requirements from the Void: Experiences with 1:10:100

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**Abstract.** In this paper we discuss our experiences with the 1:10:100 approach for organizing requirements elicitation in open innovation projects. 1:10:100 was originally developed to tackle the complexity of ‘wicked’ design problems, but also turns out to be a helpful means to organize requirements oriented project conversations with heterogeneous groups of innovation partners. We use the 1:10:100 approach to shape project phasing. We discuss the approach, report on our experiences using 1:10:100 for requirements elicitation in two service design projects in the context of health care, and based on this present some practitioner’s guidelines for using 1:10:100.

**Keywords:** 1:10:100, open innovation, requirements engineering, opportunity creation, service design

### 1 Introduction

Requirements Engineering (RE) comes in many different flavors, fitting as many different situations. The work presented here is rooted in the context of highly open design efforts, where both problem space and solution space are relatively unconstrained. In such situations, it is often problematic to get stakeholders to think ‘out of the box’ and explore novel opportunities rather than following familiar lines of thought, leading to (or even tracing back from) known solutions.

Maiden et al. distinguish between three veins in requirements engineering as a creative process: *Inspirationalist*, *Structuralist*, and *Situationalist* [1] (p62). Our current setting is very much Inspirationalist: “Focus[ing] on the interplay between consciousness and [sub]consciousness, opportunistic insight and associated breakthrough, leading to unexpected discoveries of new knowledge”.

The 1:10:100 approach stems from design practice, not requirements engineering as such. According to Dorst [2] (p85) the approach was conceived at Stanford University as an educational device to bring ‘hindsight’ into design projects and to align ‘research’ activities with ‘design’ activities. Variants of the approach are in use as an educational device at Eindhoven University of Technology [3,4] and our own university [5,6]. Moreover, 1:10:100 is increasingly recognized as an effective approach for professional design projects [2,7]. Unfortunately, despite its growing momentum, the approach has so far remained rather badly documented (which we hope to remedy to a certain degree with this paper).

1:10:100 actively encourages ‘discovery’ in a design project; it is very flexible and open to growing insight. These characteristics make it useful for projects which are (1) opportunity rather than problem oriented, (2) that are open ended design projects and (3) where there is no clear idea of the preferable solution upfront [6]. In this paper we focus on describing the approach and illustrating its utility for organizing stakeholder discussions about requirements for innovative ideas in open innovation projects [8] where problem owners and innovation partners try to cooperate to find new avenues for innovation. We critically reflect on our use of the approach and we derive some guidelines for using 1:10:100 in the future.

## 2 The 1:10:100 Approach

The 1:10:100 approach is more a principle, with some best practices than a formal method. The core idea is to go through a complete design cycle three times within a project, with varying time spans [2]. Each design cycle consists of all phases of a traditional design project, including: research, specification, ideation, prototyping and evaluation. In each cycle, a new type of solution is pursued and a new concept is developed. The numbers in the name 1:10:100 refer to the length of each cycle. The first cycle (also called the pressure cooker) is done in a single day, the second in 10 days and the third in 100 days. In practice the actual number and length of iterations differs from project to project; the 1:10:100 ratio indicates planned upscaling of time and effort in three or more stages. At the end of each cycle an evaluation session is organized with all stakeholders to evaluate and to set focus for the next session. Various formal and informal design methods can be used within each cycle of the 1:10:100 approach. Over time we experimented with service design [11], community centered development [5,12] and integrative innovation [6].

The seven most important objectives of the 1:10:100 approach as we use it in open innovation projects are:

1. To create innovative concepts in open ended, opportunity oriented projects.
2. To facilitate a reflective design conversation with the innovation partners
3. To allow for early mistakes and discovery during the project
4. To align research and design activities in the project
5. To uncover, validate and balance a wide range of requirements
6. To jointly and gradually bring focus to the project with innovation partners
7. To create a common understanding with stakeholders for innovative solutions

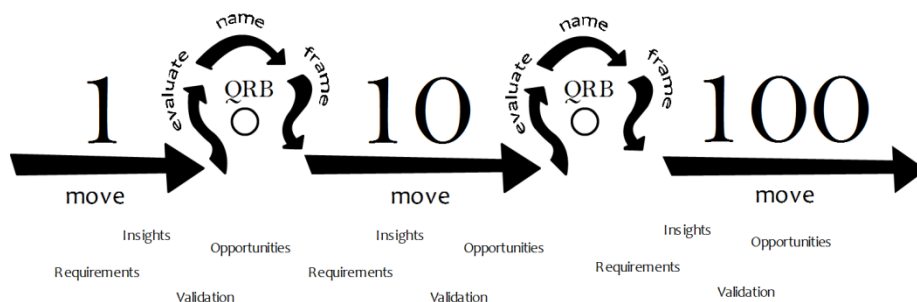
In the remainder of this section we will discuss these goals in turn.

*1. To create innovative concepts in open ended, opportunity oriented design projects*

It is not easy to run a project that focusses on opportunity creation. Typically there is no straightforward problem that can be analyzed and solved. There are no existing users (in the narrow sense of the word) that can be studied and interviewed. It may be unclear what the product family of the solution will be, so it is hard to create a benchmark for the design. And finally, it is hard to plan the ‘right’ research and design activities, because it is unclear what the appropriate research and design questions are. This is why we speak of ‘the void’ in these projects. The difficulties mentioned can never be completely avoided but 1:10:100 is at least a partial remedy because of its strongly iterative nature and its focus on embracing early mistakes.

*2. To facilitate a reflective design conversation with the innovation partners*

In 1:10:100 the designers come up with new solution proposals in each design cycle, which are supported with tangible prototypes as illustration of the proposals. The idea is to fail gracefully in the first two stages (1 and 10) of the project. With the help of the tangible idea or concept directions from 1 and 10, discussions with stakeholders on the opportunities for change are more concrete and can guide discussions about underlying desires, needs and requirements. Since all partners are aware that solution directions are likely not to be pursued, there is ample room for a critical assessment of the strengths and weaknesses of a proposed solution. We refer to these meetings as quality review boards (QRB’s). This iterative practice implements a joint form of ‘reflective practice’ as Schön defined it [9,10]. In his terminology, each cycle can be considered a design move, during the quality review board we evaluate the outcomes, we name the new priorities and issues and we frame the next cycle (Fig 1)



**Fig. 1.** The 1:10:100 as an organized reflective conversations consisting of a set of moves, evaluations, names and frames. Insights, requirements, validation of requirements and opportunities are harvested both in evaluation sessions (QRB’s) and in the design cycles between those sessions.

*3. To allow for early mistakes and discovery during the project*

In 1:10:100 projects, designers are encouraged to make mistakes and to turn these failures into something valuable. By coming up with solutions which we plan to throw away, we act as problem seekers rather than problem avoiders. This gives freedom to the designers and the flexibility to try out multiple solution directions and to discover where the unanticipated opportunities are.

*4. To align research and design activities in the project*

In contrast to design projects which start with a formal analysis phase (a typically *structuralist* approach), the analysis in the '1' and '10' stages of 1:10:100 projects can be considered 'thin'. The outcome of the analysis does not give a complete picture and is certainly insufficient to be the backbone of a long project. However, the analysis is highly relevant to the design because it is done in close conjunction with the design activities. In a traditional project much of the rigorous research turns out to be irrelevant to the design in a later stage. In 1:10:100 the design focuses the research and vice versa, tackling the interdependency of the problem and solution domain that is characteristic of 'wicked problems' [13,14].

*5. To uncover, validate and balance a wide range of (possibly conflicting) requirements*

As designers explore new solution directions in each cycle, a wide range of solution proposals gets discussed during the project as a whole. So the challenge of the open innovation consortium is discussed from several angles, leading to a broad exploration of the problem space. As all proposed solutions address the original design brief there is also overlap between the requirements that have come up in the quality review boards. The requirements that are not tied to a particular solution get validated in the second (10) and third (100) cycle. However, we do not claim 1:10:100 is a silver bullet for balancing breadth and certainty in design projects: it takes considerable skill to uncover the 'right' requirements in a 'reliable way' within the three iterations of 1:10:100.

*6. To jointly and gradually bring focus to the project*

While goals 1-5 address the benefits of 1:10:100 as a design approach, in this paper we focus on its benefits for organizing conversations about requirements with a wide range of stakeholders in open innovation projects. Some of our partners are skeptical about putting effort in designing solution proposals that are thrown away later on, but in practice discussing how and why an early proposal is off the mark turns out to be an insightful exercise for everyone involved.

Problem owners can discuss their problem and think of requirements more easily when they discuss a concrete solution proposal (that they had not thought about before). Moreover, problem owners, who tend to be the more conservative partners in these projects, may open up during the early iterations as they see that their initial

concerns can be addressed in new ways. At the same time, partners (often the designers involved) that tend to be overly optimistic about the possible solutions in the beginning, may come to take the core requirements more seriously, become less naïve, and move more ‘inside the box’, during the project.

#### 7. To create a common understanding with stakeholders for innovative solutions

A last important goal to use the 1:10:100 approach is to perform the reflective conversation mentioned under point (2) *jointly*, because choosing focus (framing) the design cycle builds involvement with, and acceptance of, the final solution direction with the partners. A ‘cold’ presentation of the innovative ideas that we develop during these projects would not work for many of the partners because the solution is too far away from the way they initially conceived it. Involving them in the reflective design conversations helps us to bring them along.

### 3 Lessons Learned in open innovation projects

#### 3.1 Two case studies: family net and labor communication

In this section we discuss two bachelor graduation projects, focusing on opportunity finding for social media integration [5] and service design for health care institutions in the context of a transition to health care 2.0. Based on these projects, we perform a comparative case study [15]. In both projects the bachelor graduate acted as the chief designer, and a heterogeneous group of partners, including representatives from health institutions and our university, took part in an ‘open innovation consortium’. The first case, referred to as *family net*, concerned collaboration between staff, seniors in care institutions and family and friends. The second case, *labor market*, focused on solving future staff shortage in care through novel approaches to the labor market. In the start of the projects, we visited the five care and nursing institutions which took part in the consortia for a discussion on the projects in considerable depth, to get an initial understanding of their expectations, explain the approach and secure their collaboration.

##### The first design cycle (1)

In both projects the goal of the first design cycle was to improve understanding of stakeholders, current working processes and user contexts, and to manage expectations. Interviews and literature scanning were used as a start. Techniques like mood boards, customer journey and application of existing design patterns were used to develop first designs. As design results, some scenarios were developed for different stakeholders. In *family net*, scenarios focused on a central information pillar in a care center. The pillar had a big red activity button that could be pushed to participate in activities. The scenarios in *labor market* were focused on using Twitter, Facebook and LinkedIn for announcing vacancies. In *labour market*, feedback on these designs was collected in separate meetings with all stakeholders. In *family net* this was done using a Quality Review Board (QRB) with all stakeholders.

The first design cycle in *family net* offered a sharp focus for users of the novel application: focus on family and friends, ignoring the difficulties of professional working processes and medical information sharing for the time being. Results of the first evaluation of the labor market project were disappointing. The problem owners mostly recognized the immediate usefulness of tools for distributing vacancies and could only comment on the perceived utility of the channels: they doubted whether LinkedIn would be appropriate. Other innovation partners criticized the straightforward design, but had little to go on to set or improve focus for the project.

### **The second design cycle (10)**

In *family net*, the goal of the second design cycle was to gain an understanding of the role of family and friends in care and welfare processes, and in challenges and solutions offered by current services. This deeper understanding was obtained by means of participation in care centers, user surveys, an interview with a successful local community initiative and by joining a patient board meeting. Building on work concerning awareness systems [16] a mood app and shared experience and participation site was developed.

In *labor market*, the goal of the second design cycle was to elaborate on the role of staff as ambassadors for their care organization, to deepen the understanding of the role of HR in a novel situation and to explore the role of potential new staff members in this process. Basic techniques used were interviews with nursing staff, HR and potential employees. The designer used the customer journey canvas to express his ideas [11].

Feedback was collected using a QRB in both projects. The most important resulting insight for *family net* was that the last design cycle should be directed at initiating participation by family and friends who are not a primary contact person (the large second ring of family and friends of a nursing home client). The most important result for *labor market* was that services should be developed for binding potential to a care institute, and services should be developed for immediate and future use of social media in staff recruitment.

### **The final design cycle (100)**

In *family net*, the goal of the last design cycle was to identify triggers that would stimulate interest and participation of family and friends. An expert interview, cultural probes, co-creation and the application of psychological theory on remorse and guilt were used to gain contextual understanding. The result of this stage was a dynamic family portrait. The dynamic family portrait informs family and friends of events in daily life, shows a photo collage of people involved with a focus on people who visit the client. In addition, the application gently invites family and friends to participate by sending a new photo.

In *labor market*, two service blueprints were developed. In both blueprints, design principles were used that were derived from the first two cycles: transparency, authentic acquaintance building and staff ambassadors. The first design is a modest extension of current recruitment services: videos are used to show nursing staff activities

and the deep satisfaction of staff helping clients and working in teams. Some staff fulfill a role as ambassador of their institute. As an add-on on this concept, future services are directed at selecting and binding potential employees to the institution using a mix of services. The ambassador staff role is central in a mix of authentic experiences and regular interaction with the institution. In the future, vacancies are fulfilled by pooling a select group of potential staff, which has already had frequent contact with the institution through the services offered in an early stage of interest.

The resulting conceptual designs from 1:10:100 have led to prototypes that were welcomed by stakeholders involved. They showed both ideas for and a technical feasibility of novel concepts. Requirements engineering at the start of these projects would probably have resulted in quite abstract demands. 1:10:100 allows us to discuss much more concrete requirements rooted in scenarios, the importance of which is agreed on with the various partners. Thus, the prototypes are an invitation to do requirements engineering based on a sufficiently mature idea and on a common understanding of the novel application and its importance and relation to the original design brief.

### 3.2 Practitioners Guidelines

Against the background of our experiences with 1:10:100 in educational contexts, we compared the two open innovation projects described in section 3.1. We studied the actual proceedings of the projects, and their results, and set these against the goals described in section 2.1. The two cases were similar in terms of challenges, but different in the way 1:10:100 was used as an approach for organizing the requirements engineering process in the consortium. This allowed for a reasonably clean comparison between the two projects. In this section we will present 5 practitioner's guidelines that we obtained from these evaluations.

#### *1. Inform partners and build trust around the process*

At first, stakeholders who are not used to innovative design projects find it hard to see the value of 1:10:100 as an innovation approach. This plays out at two levels. First, stakeholders may not immediately see the value of the 1 and the 10 as joint discovery phases and consider it a weird idea to develop throw-away solutions. This can be remedied somewhat by a clear briefing and possibly by presenting inspiring examples from other projects. We used an initial client briefing to achieve this (see 3.1). In addition, it can help if the quality review boards are filled with a mixed group of people, some with experience in 1:10:100 and some with fresh minds. The second issue using 1:10:100 with inexperienced partners is that not all parties are immediately comfortable with critically assessing proposed solutions. The facilitator of the QRB needs to play an active role in provoking clients to express both negative and positive comments, and has to seriously address these by asking for underlying beliefs, values, problems and requirements. In the two cases we described, we intervened at points where the student designers did not know how to move on.

## 2. *Start as a provocateur*

Earlier on we described how in an ‘ideal’ 1:10:100 project, more conservative partners gradually open up across multiple QRB’s, while more innovation oriented partners start to take requirements more seriously during the project, moving more ‘into the box’. This process benefits from the designer taking risks in the 1 and 10 phases. For example, in *labor market* we experienced that the designer wanted to create an acceptable solution for the problem owners right away. This led to very conservative solution proposals, in turn resulting in a lack of feedback from the innovation partners. They were not challenged to consider the problem from novel angles, and the designer did not learn enough to come up with more fitting concepts later on. With this modest approach, the utility of 1:10:100 to take partners along in the exploration diminished; so the 1:10:100 goals of a joint reflective design conversation, joint focus finding and balanced requirements gathering suffered.

## 3. *Create Common Ground and a Sense of Direction Together*

It is not always possible or desirable to bring all partners together at a QRB and QRBs may not always be conclusive about the new directions to take. This can be problematic. In particular, a joint reflective conversation, joint focus and common understanding suffer if the innovation partners miss out on the perspectives of other partners. In *labor market* we avoided joint meetings because of difficulties with schedules. This led to email briefings, but they did not turn out to be effective in achieving joint focus. In the end the designer split his final design into two parts, one primarily for the innovation oriented partners and another primarily for the problem owners. We believe this is bad practice, therefore we stress the importance of organizing joint QRB’s.

## 4. *Design skill on the QRB*

Not all QRB meetings proceed equally well. Usually we manage to involve experts and innovation partners in critiquing a proposed solution; in Schön’s terminology [9,10] we manage to *evaluate*, but we do not always manage to set priorities (*name*) and focus the design (*frame*) adequately. It turns out that these are typical designer skills [2] and in those QRBs in which these aspects remain uncovered, we have to make up for them in the intervals that we leave between design cycles. This hinders the innovative concepts, reflective conversation and common understanding goals of 1:10:100.



### 5. *Play the game for real*

In a way 1:10:100 may feel as a game: there is something uncomfortable and silly about making and evaluating throw-away solutions. This can easily lead to an attitude in which early iterations are not taken seriously and evaluations are done sloppily. Some see the approach as ‘the 100 is where it really happens –the rest is play’. The two projects we described in this paper hardly suffered from this attitude, but we often see it in student projects using 1:10:100. In some senses of the word 1:10:100 is indeed a game, but in other respects this is a counterproductive perception. If the early phases of 1:10:100 are ‘just’ play, then they are very serious play. For a designer in a 1:10:100 project, it is important to push herself to come up with a solution proposal which one believes in. For an innovation consortium too, it is important to go about the evaluations seriously. The lessons of the early stages are needed in order to be able to do things right in the 100 phase.

## 4 Conclusions

In this paper we described the 1:10:100 approach. We discussed how the approach can be beneficial for requirements engineering in open ended innovation projects with a heterogeneous group of partners. Also we shared our experiences in two open innovation projects with students acting as the service designers using 1:10:100 in various different ways. Based on our experiences we derived additional practitioner guidelines for using 1:10:100 in open innovation consortia.

We were surprised to learn that open innovation problems can be successfully addressed by students in bachelor programs of information systems and media design curricula of our university. The 1:10:100 approach supports us in developing an understanding by stakeholders of novel approaches to future opportunities. An unexpected benefit is that it facilitates our stakeholders, encouraging them to go along with us along the innovation path. The approach results in an understanding of future needs, by us and our stakeholders. Moreover, the 1:10:100 approaches allows us to bring a quick focus to the requirements engineering process for future applications, without compromising the innovation space of the designers.

In future research we plan to contrast the 1:10:100 approach to other requirements engineering approaches for radical innovation, to get a better understanding of the trade-off between costs and benefits of 1:10:100.

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