



**HAL**  
open science

## Participatory Ideation for Gamification: Bringing the User at the Heart of the Gamification Design Process

Thomas Vilarinho, Babak Farshchian, Jacqueline Floch, Ole Gunhildsberg Hansen

### ► To cite this version:

Thomas Vilarinho, Babak Farshchian, Jacqueline Floch, Ole Gunhildsberg Hansen. Participatory Ideation for Gamification: Bringing the User at the Heart of the Gamification Design Process. 7th International Conference on Human-Centred Software Engineering (HCSE), Sep 2018, Sophia Antipolis, France. pp.51-61, 10.1007/978-3-030-05909-5\_4. hal-02270710

**HAL Id: hal-02270710**

**<https://inria.hal.science/hal-02270710v1>**

Submitted on 26 Aug 2019

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

# Participatory ideation for gamification: Bringing the user at the heart of the gamification design process

Thomas Vilarinho<sup>1</sup>, Babak Farshchian<sup>2</sup>, Jacqueline Floch<sup>1</sup>, and Ole Gunhildsberg Hansen<sup>2</sup>

<sup>1</sup> SINTEF, Trondheim, Norway

{thomas.vilarinho | jacqueline.floch}@sintef.no

<sup>2</sup> Norwegian University of Science and Technology, Trondheim, Norway

{baf@idi.ntnu.no | ole.gunhildsberg.hansen@gmail.com }

**Abstract.** Gamification, i.e. applying game elements in non-game contexts, is being increasingly used for designing systems and application elements to foster user engagement, enjoyment and support behavior change. Experts agree that, to be efficient, gamification strategies should be designed in a user-centric fashion. However, current user-centered design approaches in gamification primarily involve users during user research and iterative testing. In this paper, we describe an ideation approach for involving users in the conceptualization of gamification, making the gamification design process a more participatory activity, a process done with the user rather than for the user. Our results show that our method fostered participation without confining creativity. Participants were able to generate many ideas, several of them being “out of the box”.

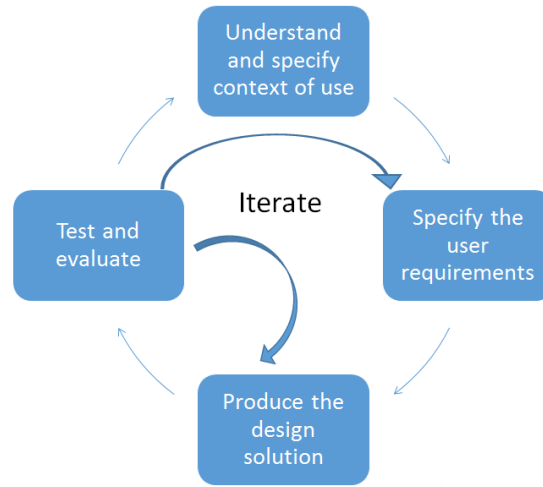
**Keywords:** Participatory Design · Gamification · Ideation.

## 1 Introduction

Computer supported applications are increasingly using gamification for boosting user-engagement and motivation, and for supporting behavior change. Gamification corresponds to the usage of game elements in non-game contexts [2]. It has been applied in multiple domains such as health [11], education [4] and energy [21]. Empirical studies show positive outcomes [9] of using gamification for supporting behavior change. Gamification aims to evoke enjoyment and support users’ inherent goals. Therefore the design of gamification requires a deep understanding of the users’ context and needs [3]. As a result, different user-centric approaches for designing gamification are proposed [3, 18, 7, 16, 14]. However, the articles above, and others reviewed in [17], involve users chiefly during the user research or the testing of solutions, even if experts consider it important to involve users in the design of the solution as well.

Taking the Human-Centered Design Process as specified in the ISO 9241-210 [5], and illustrated on Figure 1, as a baseline, current research in gamification

shows that users are involved mainly in the phases of “Understanding and specifying the context of use” and the “Testing” in the current gamification design approaches. The phase of “Producing the design solution”, which includes an ideation (the formation of ideas and concepts) step and the development of the prototype itself, often do not involve the users and, in fact, are rarely and little described when it comes to gamification design [17]. Including the users into the “Production of the design solution” elevates the process from *user-centered* design towards a *participatory* design, and, consequently, increases the chances of more deeply understanding the users and reaching their tacit knowledge [20].



**Fig. 1.** ISO Human-Centered Design Process, adapted from [5]

Designing a gamification concept is a challenging task as it requires the designers to build strategies that support the behavioral outcomes wished by the users based on the activities that lead to those behavior in accord to the users’ context and their motivation. The complexity behind the gamification concept design may be one of the reasons why designers have not involved users in this step of the process. Consequently, the gamification ideation approaches described in the literature, such as [15], are tailored to be used by designers and researchers, and have been tested with those stakeholders, rather than with end-users.

In our research, we try to address the lack of scientifically published approaches for participatory ideation within the gamification design. We propose an approach for conducting the ideation of gamification design in a participatory fashion. Our approach involves getting users to brainstorm gamification concepts, taking into consideration the elements for reaching their behavioral goals. We investigate the suitability of this approach in terms of generating high-quality ideas, whether its structure effectively triggers the users’ participation and whether it restricts the creative process:

- Does the approach facilitate participants engagement? Do moderator(s) need to intervene often, stirring the process?
- Do participants restrict themselves to ideas based on the presented gamification mechanics or do they go beyond that? Do they bring ideas linked with their inherent motivation?

## 2 The Ideation Approach

Our approach focuses on ideation. We, therefore, assume that the user research was already done to understand the users' needs and context. It relies on the facilitators having previously uncovered the **behavioral outcomes** wished by the target users, the **activities** that contribute to those outcomes and motivations and barriers linked to those activities.

The proposed ideation approach is rooted in the building blocks of gamification, as defined by [9], where motivational affordances [23] are implemented with the intent to trigger psychological outcomes that lead to behavioral outcomes. Our approach is designed as a workshop structured in 5 steps:

1. Introduction: Mutual introduction and possible ice breaking activities followed by a presentation of the workshop context and purpose.
2. Presentation: The workshop moderator presents the findings from earlier user research, and introduces gamification to participants.
3. Ideation: Participants generate ideas in a brainstorming process.
4. Ideation review: Participants review the ideas, possibly discarding, rating or prioritizing some of them.
5. Closing: The workshop moderator thanks the participants and informs them about the next steps of the overall gamification design process.

The Introduction and Closing steps have no strict format. They should be tailored according to whether the participants already have participated in the user research, and whether they are familiar with the overall process.

The Presentation step summarizes the desirable, but still unreachd, **behavioral outcomes** for the target user group, and the **activities** that contribute to those outcomes. By **activities**, we mean application features or real-world user activities supported by the application for reaching the outcomes. For example, registering food intake is an **activity** that can support a desired **behavioral outcome** of losing weight or pursuing a diet.

For being able to build meaningful gamification, the **activities** must fall under a "gamification design fit" as described in [3]:

- Activities must support users to reach their desired behavioral outcomes;
- Users should demonstrate a lack of motivation for performing such activities, for example when the activity is time-consuming or perceived as boring;
- The activity performance can contribute to basic psychological or social motives such as mastering a skill, achieving autonomy, socializing, etc.

Ensuring the "gamification design fit" essentially means that the activities to be gamified are those that the user lacks motivation to perform despite them having a positive effect in contributing to reach his/her goals. It is a crucial step in order to address possible gamification pitfalls described in [12]: such as, encouraging behaviors that do not contribute to the user goals or not supporting the development of an intrinsically motivating underlying psychological or social motive. Therefore, participants should be allowed to feedback and discuss the **behavioral outcomes** and related **activities** presented, especially if they were not part of the user research which uncovered those.

After going through the **behavioral outcomes** and related **activities** with the participants, the workshop moderator introduces gamification to them. For that purpose, we created a set of cards describing different popular gamification mechanics, such as points, badges and progress bars, and mapping these mechanics to motivational aspects fostered by them. Figure 2 illustrates the card used for presenting progress bars and the one for challenges. The whole set can be retrieved in [10].

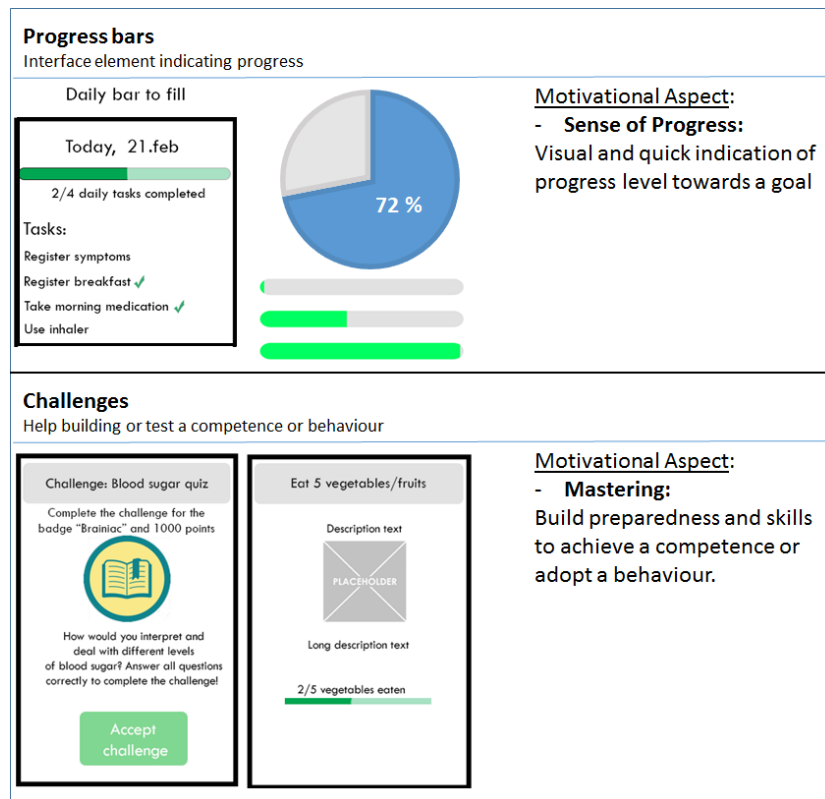


Fig. 2. Progress Bar and Challenge cards example

The card format follows recommendations from evaluations of similar cards used for inspiring and guiding brainstorming [15]: each card describe the underlying motivational aspect, and represents this with a concrete example of a gamification mechanic supporting it.

The cards are not part of a game to be played during the workshop, as in [15]. We did not want to introduce game-play rules which could hinder the creative process nor complicate the Ideation step. Instead, the cards rather serve as cues illustrating how concrete mechanics can affect the user motivation needs, more similarly to how cards were used in [8]. Thus, the intention of using the cards is to dismantle some of the complexity behind gamification design.

The motivational aspects illustrated in the mechanics, the **activities** and the **behavioral outcomes** are the core components our approach tries to root the ideation into. They serve as the mechanism to focus the brainstorming and guide the Ideation into coming up with concepts that effectively support the users to achieve their behavioral goals

During the Ideation step, the workshop moderator should ask the participants to select a **behavioral outcome** of their interest and brainstorm gamification ideas that can motivate them on performing activities that support such outcome. For that, it can be useful to draw a table in a white board or flip-chart in order to easily map the different ideas in relationship to their respective goals and activities (see Figure 3 for an illustration of such table). The cards should be available for participants to consult and draw inspiration about how to concretely address a motivational aspect connected to an activity.

In case the participants struggle to come up with ideas, moderators should not push participants to go through the cards, but rather ask them questions, similarly to innovation steams as proposed in [3], to help them reflect on support needs related to their activities and goals. For example: "What challenges are inherent in [activity]?", "Why is this [goal]/[activity] challenging?", etc. In that way, the facilitation becomes more value oriented rather than technology driven.

Usually, the first ideas generated during brainstorming are not the best ones. The last ideas generated tend to be of higher quality [19]. Therefore, it is useful to review the ideas with the participants for understanding whether some ideas can be merged, and some should be discarded, and to set priorities on ideas.

### 3 Evaluation set-up

The proposed ideation approach was designed in the context of the European research project MyCyFAPP[1]. The aim of MyCyFAPP is to provide health self-management support to persons affected by Cystic Fibrosis (CF), with focus on nutritional aspects. The user needs were identified [6] and a non-gamified mobile application had been co-designed [22]. The treatment of CF is very demanding. Even if the co-designed CF application helps users managing their health, the application features require users to dedicate some of their scarce time to the self-management of the disease. Consequently, the CF application falls under the



Fig. 3. Ideas resulting from brainstorming session

”gamification fit” scope. Designers in the project therefore decided to investigate whether gamification elements can be added to further motivate the users.

Before evaluating the ideation approach with persons with CF in the context of MyCyFAPP, two workshops were conducted involving healthy persons and using a fictive related scenario: designing gamification for the existing application MyFitnessPal<sup>3</sup>, a mobile application that supports nutrition tracking towards weight loss. Each of those workshops involved a single participant interested in nutrition management, akin of the researchers but not familiar with the research. One participant had experience with games and gamified applications, the other did not. The **behavioral goals** ”Helping to control caloric intake” and ”Learning about food nutrition” were defined as a basis. We selected the relevant **activities** towards these goals, i.e., registering food intake and visualizing nutrients of food intake during the day.

Then, two other workshops, now using the CF application developed in MyCyFAPP as baseline, were conducted. They followed the same format as the earlier workshops but introduced an additional moderator. Given the demanding treatment and the rarity of the disease, accessibility to persons with CF is a major challenge. Consequently, each workshop included only one CF patient.

<sup>3</sup> <https://www.myfitnesspal.com>

These patients had earlier contributed to the user research and co-design activities of the baseline CF application. Five different **behavioral goals** identified in the user research were presented at the *Presentation* step of the workshop: 1) Learning about nutrition and how it affects health; 2) Learning and becoming proficient in estimating the enzyme dosage; 3) Following and understanding symptoms together with being able to explain them to the doctors; 4) Remembering medicine intake; 5) Learning more about CF and its treatment. The baseline application activities contributing to those goals, such as registering food intake or keeping a health diary, were also presented and linked to their related behavioral goals.

Table 1 provides an overview of the participants age and experience besides the number of ideas in relationship to the workshop and goals, while in the next section we discuss the results and dynamics of the workshops.

**Table 1.** Workshops overview

Baseline	Age	Stated Gaming experience	# ideas	# goals	ideation time
MyFitnessPal	24	Play games and use gamified apps	12	2	30 min
MyFitnessPal	23	No experience	10	1	20 min
CF app	22	Play games	21	6	90 min
CF app	16	Play games and use gamified apps	20	4	60 min

## 4 Evaluation results

In this section we analyze the results of the workshops in terms of the resulting ideas, the user participation and workshop dynamics.

### 4.1 Ideas Quality and Scope

In all workshops, participants frequently generated ideas building on top of each other’s ideas, leading to the generation of sets of elaborated ideas composed of many elementary ideas. Consequently, some of those elaborated ideas linked different gamification mechanics into a larger gamification concept. For example, in one of the CF workshops, a participant first suggested a forum-like question and answers system for discussing symptoms. He kept bringing up more ideas so that his concept evolved to incorporate: 1) levels and avatars for representing the knowledge around symptoms one has built through the Q&A, 2) special avatars for characterizing doctors and distinguishing their contribution on the Q&A, 3) points for quantifying the contribution to the community, etc.

Another aspect we noticed was that the ideas from participants of the same baseline workshop differed, and, in each workshop, one motivational factor recurred most. While one of the CF participants was more interested in gamification elements that trigger competition, the other was interested in quantifying



and measuring competence development. This highlights the importance of running the approach with a representative user sample covering different characteristics of the user group population as in other user-centered studies [13]. In our tests, the experience of the participants with games or gamification applications did not influence the number of ideas suggested, but it influenced the level of details provided and the amount of time the workshop lasted. Those with more experience would elaborate the ideas further without much support from the moderator. They went beyond gamification elements and suggested additional system features or usability related interaction elements. For example, the aforementioned participant suggested having hash-tags and a hash-tag based search for facilitating users to find a specific symptom.

We did not formally evaluate the generated ideas of the workshops. Instead, we reviewed the ideas at the end of each workshop with the participants and discussed which ones they preferred. Participants always found one or two elaborated ideas that they truly liked and were confident that would motivate them. Some of the ideas on the CF case overlapped with gamification ideas thought by the researchers in MyCyFAPP, while others were completely new. The researchers in MyCyFAPP found these new ideas highly relevant and they were further sketched to feed a future version of the App design.

## 4.2 Workshop Dynamics

The structure of the workshop seems to work well. Participants were interested and attentive during the presentation part. They talked comfortably and spontaneously brought ideas during the ideation phase. Moderators mainly intervened to ask details and clarification, not to trigger ideas. Participants did not lose track of the workshop focus. The ideas, in most part, were centered on the wished behavior goal or activities that support that goal.

When it comes to the workshop set-up, a single moderator conducted the first two workshops. In that case, the moderator steered the process while the participants were responsible to express their ideas, write them down in post-its and place them on a board next to the support goal (See Figure 3). We found out that asking participants to write and place the ideas interrupted their flow of thought. Therefore, two moderators were assigned to run the workshops using the CF App as baseline. There, one of the moderators was dedicated to write down the participants ideas on the post-its and place them on the board. We noticed that relieving the participants from writing down the ideas significantly help them to immerse in the process and further develop the ideas.

The moderators did not have to intervene for participants to start eliciting ideas, but they took an active stance in terms of: repeating participants ideas for acknowledgment of understanding and asking further details about those ideas. Such interventions would often result on the participant further developing his idea, bringing up related ideas and combining some of his ideas. For example, a participant started by stating the following idea for helping him to learn about nutrition: "...there could be some challenges in format of questions, competition questions, so that one can check that he has learned." Then moderators repeated

the idea and asked which kind of questions and competition he was thinking about. That lead the participant to describe that he thought of receiving a quiz once or twice a week, and that, by answering it correctly, he would gain points to be counted towards a local and a global leaderboard.

The moderators deepening questions also helped so that the result of the workshops not only consisted of a collection of ideas, but the elaboration of whys and how those ideas would take place. Consequently, the recordings of the ideation became valuable data for further understanding the user and their motivations through thematic analysis. Such result is consistent with the participatory design premise that engaging people in creation activities allow us to tap into their tacit knowledge [20].

The cards also served their intended purpose. Participants used mechanics presented in the cards and described elements of their ideas referring to motivation elements supported by the mechanics. At the same time, the cards did not become the center of attention of the workshop. Participants would seldom go through them (once or twice per session), mainly when they were out of ideas. Furthermore, participants were able to think “out-of-the-box” and did not restrict their ideas to the mechanics described in the cards. They would also refer to concepts they have used or seen in life experiences or other applications which were not present in the cards, such as the already described question and answers system.

We did not directly ask participants whether they had problems understanding the cards or the underlying concepts and examples described on them. However, the fact that they used mechanics and motivation elements from the cards and did not asked for clarifications about them indicates that they were well understood.

## 5 Conclusions, Limitations and Further Work

The results indicate that the workshop format helps participants produce meaningful gamification ideas without constraining creativity. Participants could come up with many ideas supported by motivational factors, focused on the behavior goals and did not restrict themselves by the presented mechanics.

Similarly other card-aided ideation approaches[8], having the cards as inspirational support elements rather than mandatory building blocks for the ideas led to situations where users would combine mechanics from several cards within an idea to situations where the idea was not rooted into a mechanic exemplified by a card. Furthermore, the presentation step and rooting of the design problem into the activities that lead to the desired behavioral outcome proved sufficient to ensure focus and convergence in the process.

Some of the ideas the participants of the CF workshops came up with had not been thought by the MyCyFAPP researchers and were considered highly promising. This confirms that user involvement in the ideation phase can bring value to the design process, even if the design team knows well the user’s needs and context.

However, for confirming the value of the approach, the ideation workshop format should be further tested with other user profiles and in relation to other gamification application domains. The participants in our workshops were from similar demographics (university or high-school students from Norway) and both scenarios were around health self-management.

Another confirmation step is to empirically validate the quality of the ideas through user or expert studies, or, by implementing them and observing the effect of the gamification concepts in real life.

Due to the nature of CF, we could not group patients together and therefore run workshops with only one participant at time. There are no constraints in the proposed approach that prevents executing it with a group of participants. In fact, brainstorming sessions benefit from group participation as it enables bringing together people with different backgrounds. It will be interesting to observe how our method will perform in a set-up with multiple participants at a time. Similarly, it will be interesting to investigate more deeply the cards contribution to the process and the effects of possibly extending the number of cards.

## 6 Acknowledgments

Authors of this paper, on behalf of MyCyFAPP consortium, acknowledge the European Union and the Horizon 2020 Research and Innovation Framework Programme for funding the project (ref. 643806). Furthermore, we thank the participants to the workshops for their interest and collaboration. Ole Gunhildsberg Hansen was a student at the Norwegian University of Science and Technology when conducting this research, which is also part of his Master Thesis [10].

## References

1. Calvo-Lerma, J., Martínez-Jimenez, C.P., Lázaro-Ramos, J.P., Andrés, A., Crespo-Escobar, P., Stav, E., Schaubert, C., Pannese, L., Hulst, J.M., Suárez, L., et al.: Innovative approach for self-management and social welfare of children with cystic fibrosis in europe: development, validation and implementation of an mhealth tool (mycyfapp). *BMJ open* **7**(3), e014931 (2017)
2. Deterding, S.: Gamification: designing for motivation. *interactions* **19**(4), 14–17 (2012)
3. Deterding, S.: The lens of intrinsic skill atoms: A method for gameful design. *Human-Computer Interaction* **30**(3-4), 294–335 (2015)
4. Dicheva, D., Dichev, C., Agre, G., Angelova, G.: Gamification in education: a systematic mapping study. *Journal of Educational Technology & Society* **18**(3), 75 (2015)
5. DIS, I.: 9241-210: 2010. ergonomics of human system interaction-part 210: Human-centred design for interactive systems. International Standardization Organization (ISO). Switzerland (2009)

6. Floch, J., Zettl, A., Fricke, L., Weisser, T., Grut, L., Vilarinho, T., Stav, E., Ascolese, A., Schaubert, C.: User needs in the development of a health app ecosystem for self-management of cystic fibrosis: User-centered development approach. *JMIR mHealth and uHealth* **6**(5) (2018)
7. Francisco-Aparicio, A., Gutiérrez-Vela, F.L., Isla-Montes, J.L., Sanchez, J.L.G.: Gamification: Analysis and application. In: *New trends in interaction, virtual reality and modeling*, pp. 113–126. Springer (2013)
8. Halskov, K., Dalsgård, P.: Inspiration card workshops. In: *Proceedings of the 6th conference on Designing Interactive systems*. pp. 2–11. ACM (2006)
9. Hamari, J., Koivisto, J., Sarsa, H.: Does gamification work?—a literature review of empirical studies on gamification. In: *System Sciences (HICSS), 2014 47th Hawaii International Conference on*. pp. 3025–3034. IEEE (2014)
10. Hansen, O.G.: What gamification design do users want in a self-management application for chronic diseases?—The case of Cystic Fibrosis. Master’s thesis, NTNU (2017)
11. Johnson, D., Deterding, S., Kuhn, K.A., Staneva, A., Stoyanov, S., Hides, L.: Gamification for health and wellbeing: A systematic review of the literature. *Internet interventions* **6**, 89–106 (2016)
12. Knaving, K., Björk, S.: Designing for fun and play: exploring possibilities in design for gamification. In: *Proceedings of the First International Conference on Gameful Design, Research, and Applications*. pp. 131–134. ACM (2013)
13. Kujala, S., Kauppinen, M.: Identifying and selecting users for user-centered design. In: *Proceedings of the third Nordic conference on Human-computer interaction*. pp. 297–303. ACM (2004)
14. Kumar, J.: Gamification at work: Designing engaging business software. In: *International Conference of Design, User Experience, and Usability*. pp. 528–537. Springer (2013)
15. Lucero, A., Arrasvuori, J.: Plex cards: a source of inspiration when designing for playfulness. In: *Proceedings of the 3rd International Conference on Fun and Games*. pp. 28–37. ACM (2010)
16. Marache-Francisco, C., Brangier, E.: Process of gamification. *Proceedings of the 6th Centric* pp. 126–131 (2013)
17. Morschheuser, B., Hamari, J., Werder, K., Abe, J.: How to gamify? a method for designing gamification. In: *Proceedings of the 50th Hawaii International Conference on System Sciences* (2017)
18. Nicholson, S.: A user-centered theoretical framework for meaningful gamification. *Games+ Learning+ Society* **8**(1), 223–230 (2012)
19. Osborn, A.: *Applied imagination* (new york: Charles scribner’s sons) (1953)
20. Sanders, E.B.N.: From user-centered to participatory design approaches. In: *Design and the social sciences*, pp. 18–25. CRC Press (2003)
21. Vilarinho, T., Farshchian, B., Wienhofen, L.W., Franang, T., Gulbrandsen, H.: Combining persuasive computing and user centered design into an energy awareness system for smart houses. In: *Intelligent Environments (IE), 2016 12th International Conference on*. pp. 32–39. IEEE (2016)
22. Vilarinho, T., Floch, J., Stav, E.: Co-designing a mhealth application for self-management of cystic fibrosis. In: *IFIP Conference on Human-Computer Interaction*. pp. 3–22. Springer (2017)
23. Zhang, P.: Technical opinion motivational affordances: reasons for ict design and use. *Communications of the ACM* **51**(11), 145–147 (2008)