

## Let's DEsign for MOTivation (DEMO)

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**Abstract.** Design for motivation can be defined as a “design practice focused on the activation of human motives, with short or long-term effects, to perform an action” in a context. The paper proposes and develops a design tool called DEMO (DEsign for MOTivation) that aims to address motivation in innovation communities. The DEMO tool is theoretically grounded in motivation theories and based on existing game-like approaches for the development of motivational concepts. The tool incorporates gamification elements, design elements and targets to support multidisciplinary teams in designing for motivation. One application area of the tool is in innovation communities where the design to support user participation and contribution is a complex task, while there is limited understanding how to practically apply motivation. An expert usability evaluation reflected a positive overall experience with the tool. The contribution of this paper lies in its description of the tool and its report on the usability evaluation. Future research in the field should focus on the application of the design tool with various methods in diverse cases.

**Keywords:** DEMO; design tool; innovation community; motivation; usability study.

### 1 Introduction

Motivation is widely understood as the activation of a person to do something, while people have different amounts and kinds of motivation [29]. Much research focused on studying what motivates people in various contexts and communities [e.g. 39; 34; 2], in order to understand the people and their motivational drivers to join, participate or contribute to a community, among other issues. Additionally, in the last decade there has been increasing interest in the design of services and systems with a focus on behavioural change [35; 16] and persuasion, as well as gamified experiences with technology [e.g. 8; 11]. These topics are particularly applicable in online communities that depend on the commitment and voluntary participation of their members, for example in innovation communities. Various types of innovation communities, such as brand communities and innovation intermediaries [34], facilitate user interactions who are motivated in doing an activity. Design for such communities to support user participation, engagement and contributions is a complex

task due to joint application of motivation theories (e.g. Self-determination theory [29]), design approaches (e.g. persuasive design [16]) and other practices (e.g. gamification). However, there is limited understanding of how to apply theories in designing motivational mechanisms.

Design for motivation can be defined as a “*design practice focused on the activation of human motives, with short or long-term effects, to perform an action*” in a context like an online community. It is argued that the design of online communities based on theory can lead to different levels of user participation [28]. However, existing design approaches and tools [e.g. 16; 21; 8] have not yet been explored or evaluated in applied research, and only generic descriptions of these approaches and tools are available. There is, therefore, a need to merge these into a conceptual understanding of how motivation theories and design practices can be applied in the design of motivational services and systems.

We propose a design tool, called DEMO<sup>1</sup> (DEsign for MOtivation), with the aim of filling this gap in the literature. The DEMO tool supports multidisciplinary teams in designing for motivation in innovation communities. The tool is inspired by gamification elements and it seeks to provide a systematic method for developing a design plan for motivation. DEMO is designed for use by multidisciplinary teams comprising designers and non-designers, such as managers, psychologists and other experts engaged in motivation techniques. Usability evaluations of the tool were conducted as a first step to uncover potential issues. The findings indicate that general experiences with the tool were positive. The contribution of this paper lies in its description of the design tool and how this tool could be used in practice by multidisciplinary teams to conceptualise motivational designs during their early stages. A second contribution refers to the report of the usability evaluation.

The next section presents related work, including a review on theories for motivation and existing design approaches. It concludes with the critical review of the design approaches. Afterwards, specifics on the design of the DEMO tool and its components are presented. At the end, the results of a usability evaluation with experts and conclusions are presented and discussed.

## **2 Related Work: Theories, Tools and Approaches to Design for Motivation**

Design for motivation is a highly complicated process because of the involvement of numerous activities and challenges. Each activity can be accomplished by one (or more) designers, each of whom may choose to use different tools. For instance, one crucial activity is to “be creative” and generate ideas especially in early design stages [33]. The challenges refer to, but they are not limited to, how to apply existing theories to design [28; 30], which methods and tools to select [33; 3], and other issues related to the design team and creativity [13; 5; 6].

Motivation to act has been studied in various fields, such as social psychology, educational psychology, and organisational science; however, the application of

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<sup>1</sup> Information about the DEMO tool, see here: <https://designformotivation.com/>

motivation differs for each of these fields. Across various application areas, two primary types of motivation are used: intrinsic and extrinsic. Motivation is intrinsic if, by engaging in an activity, an individual gains inherent satisfaction. By contrast, in cases of extrinsic motivation, the activity is an instrument for accomplishing a certain desired outcome of future events [29]. Self-determination theory is a theory of motivation that encompasses both intrinsic and extrinsic motivations on a continuum from internal to external motivation [29]. For instance, intrinsic motivation in innovation communities could refer to a user's need to collaborate and learn through an activity, while extrinsic motivation is often related to virtual goods and monetary compensation. Other theories of motivation can be placed closer to extrinsic (e.g. Maslow's hierarchy of needs [23]) or intrinsic (expectancy value theory [38]) or between extrinsic and intrinsic, such as social-based theories [15]. The application of motivation theories in innovation communities is a common practice for promoting participation [e.g. 2; 36]. Many studies have examined the intrinsic, extrinsic and social motives of user participation in innovation communities. For example, one case study on open innovation communities suggested that monetary rewards are not always the best way to motivate users [2]. Specifically, contributors also value intangible factors, such as community cooperation, learning and fun, particularly when combined with good support and the right cooperation tools [2]. In a second example, a study on a crowdsourcing community showed that intrinsic motivation was more important than extrinsic motivation in inducing participation and suggested a balanced view of extrinsic and intrinsic motivation in order to encourage participation in crowdsourcing [39]. Other studies have produced similar results [e.g.18; 34].

In practice, the application of motivation theories in innovation communities is discussed within persuasive design [e.g. 16; 35; 36], game design [e.g. 25; 37] and gamification [e.g. 11; 22; 24]. Persuasive design aims to change users' attitudes or behaviours by applying persuasion and social influence through the design of a technology [16; 17]. The design tools of persuasive technology include models, methods, processes and game cards, as well as more traditional methods and tools [16; 17; 4]. It has been argued that design can be seen as inherently persuasive and that objects can be understood as arguments in material form [27]. Motivation theories are applied in games frequently, since games are believed to be capable of changing behaviours both in the game world and in the real world [35]. However, game design uses limited design techniques and tools, meaning design documents and software prototypes as the basic tools for development [1]. Typically, game elements, such as competition, conflict, rewards, resources, time and levels, comprise the motivational elements for game design and beyond. At the intersection of behaviour analysis and game design, we find the widely-used approach of gamification [25]. According to a survey [30], such theoretical foundations as self-determination theory, intrinsic and extrinsic motivation and situated motivational affordance are only few examples of theories currently used to support gamification systems. Gamification is positioned as a "tool that may be used to facilitate extrinsic and intrinsic motivation to accomplish specific tasks through the selective use of game element" [30]. Gamification elements, like game design elements, have been applied and measured in a broad range of fields, such as marketing, learning and health [30; 22; 24].

Deterding argues that “gamification is really a motivational design problem, one that can be best solved with design thinking and design processes” [11].

Design thinking (DT) has attracted the interest of both scholars and practitioners because of the applicability of design methods for promoting innovation and the applicability of DT across many areas [7]. DT shares common methods and tools with service design (SD), interaction design and user experience (UX) design for the development of products and services and is capable of supporting designers in all phases of development. Practical guides for designers [32], online guides for design methods and tools [31], and reviews and case studies on DT and SD tools [e.g. 9] clearly show the wide applicability of DT for both designers and non-designers.

When designing for motivation, another challenge of the early design phases is the selection of tools. Designers and non-designers who are involved in the process have to select from among a broad range of methods and tools. Highly formal methods provide step-by-step instructions or “recipes” to enhance creativity [33], such as in game design [1]. Other designers use un-structured approaches and tools, such as frameworks [33]. In some design fields have well-defined approaches to what constitutes a core set of tools. This is not the case when design for motivation where many of the tools are also commonly found in other design fields.

## 2.1 Existing design tools and approaches for motivation

Design approaches from various fields, such as persuasive design, game design and gamification, aim to increase user motivation or target behavioural change by applying motivational mechanisms and creating gamified experiences. Hereafter, we briefly describe a list of design approaches/tools and their phases. It is important to note that this is not an exhaustive list of methods and tools (Table 1); it is representative though:

**Persuasive design:** Persuasive design is a model for understanding human behaviour presented by Fogg [16]. The FBM (Fogg Behaviour Model) identifies and defines three factors—motivation, ability and triggers—that control whether a behaviour is performed. In addition, Fogg [17] suggested a process to follow as a best practice in the early stages of persuasive technology design. This process consists of eight steps: targeting a simple behaviour, finding a receptive audience, finding what prevents the target behaviour, choosing a familiar technology channel, finding relevant examples of persuasive technology, imitating successful examples, testing and iterating quickly and, finally, expanding on success. In the field of persuasive design and human-computer interaction (HCI), Weiser et al. [36] suggested a taxonomy of motivational affordances for the design of persuasive technologies. This taxonomy links design components that are typically found in psychological theories on motivation and includes three levels: general design principles, mechanics and elements.

**Game design:** The MDA (Mechanics, Dynamics, Aesthetics) framework [21] uses systems thinking to describe the interplay of game elements and apply them outside of games. Mechanics refer to the functioning components of a game, including the various actions, behaviours and control mechanisms afforded to the player. Dynamics work to create aesthetic experiences for the player and describe the run-time

behaviours of the mechanics. Aesthetics describe the desirable emotional responses evoked in the player when the player interacts with the game system.

**Gamification:** The “player experience design” process [8] focuses on players’ goals and consists of seven phases: defining the business outcomes and success metrics, the target audience, the player’s goals, the player’s interaction with the gamified solution, the play space and the player’s journey in regards to the provided environment, the incentives and rewards and, finally, the gamified solution, which must be tested and iterated. The “player centered design” process [22] is inspired by the user-centred design philosophy and embeds the concept of engagement. The process consists of five phases: understanding the player and the context of play, defining the mission and the desired business outcome, identifying the human motivation, applying game mechanics with respect to the user interface elements and, finally, managing the mission and metrics and monitoring player motivation. The “Six D’s” gamification design framework [37] describes a design process with six phases designed to define business objectives, delineate target behaviour to promote business objectives, describe the players, devise activity loops, embed fun aspects and, lastly, deploy appropriate tools in order to support the alignment of user behaviour and product objectives. The user-centred RECIPE framework [26] targets long-term user engagement and consists of six phases: defining the boundaries of play, exposing the players to the real-world story, the players’ choices within the system, the game design and game display concepts, the players’ engagement (through encouragement) to discover and learn from others and, finally, reflection, which refers to assisting participants in finding other interests and past experiences that can deepen engagement and learning. Lastly, the “gamification model canvas” [19] is a tool to develop gamified behaviours in non-game environments based on the MDA Framework and the Business Model Canvas. The Business Model Canvas defines nine elements: the implementation platform, mechanics, dynamics, aesthetics, players, feedback components, players’ behaviours, related costs of the game and, finally, revenues (i.e. the economic or social return of the solution via the introduction of gamification).

**Table 1: Design approaches for motivation.**

Field	Tool/ Approach	References
Persuasive design	FBM model/ process	[16, 17]
	Taxonomy of motivational affordances	[36]
Game design	MDA framework	[21]
Gamification	Player experience design process	[8]
	Player centered design process	[22]
	“Six D’s” gamification design framework	[37]
	User-centered framework 'RECIPE'	[26]
	Gamification model canvas	[19]

## 2.2 Summarized findings

In summary, the related work shows that the challenge in addressing motivation in design are defining links with theory and selecting tools. The majority of existing tools lack of theoretical grounding, especially in gamification-related approaches. Examples, cases and best practices on how to conceptualise design for motivation in practice, with a detailed description from theory to concepts and designs, are also missing. The reviewed approaches (Table 1) have similar phases and provide unstructured ways to design for motivation; yet, their phase descriptions are quite general, without any practical guidance or potential limitations. In addition, there is a lack of description of the use context concerning, for example, what the targeted users may be, whether certain competencies are required to utilise the tools, which development phases should be used when, etc. The reviewed approaches have not been sufficiently explored through applied research and/or evaluated according to usability, performance or other metrics. Lastly, with the exception of the “gamification model canvas” [19], there is a lack of visual representations for guiding the design processes. However, some of the examined approaches and phases have the potential to support future approaches. Therefore, in sum, designing for motivation is a complex activity, and there are several limitations to consider when selecting design tools. Gamification is a promising approach for addressing motivation in innovation communities. Additionally, both intrinsic and extrinsic motivation should be addressed to capture the wide variety of motivation factors, as was suggested in Fogg’s model [16] and the taxonomy of motivational affordances [36]. Based on the related work, theories and design approaches, we argue that we need a more structured approach in this field.

## 3 DEMO - A Tool to Design for Motivation

The idea for developing a tangible tool emerged while working with industrial partners, who wanted to increase user motivation in innovation communities and to ideate about motivation. As discussed, existing work related to design tools shows that existing approaches fail to address important design issues. This gap constitutes the basis for developing the DEMO tool. DEMO is a design tool that supports multidisciplinary teams in the early phases of development to design for motivation. We refer to multidisciplinary groups as groups consisting of designers (e.g. game, interaction and service designers), managers, psychologists, developers and other participants. The tool is theoretically grounded on motivation theories, it incorporates design concepts for motivation, through a stepwise process based on cards. DEMO also uses visual representations as a way of rising communication in multidisciplinary groups during workshops. In particular, we examine the application of the tool in the case of innovation communities. Previous research into design and collaborative teams, participatory design, design and creativity support the design of our suggested tool, as does research on using cards and games as innovation support tools [5; 6; 20; 10].

The DEMO tool consists of three main parts: the template, the cards and the roles. Figure 1 shows an early version of the template and examples of cards. One important advancement implemented in the DEMO tool (compared to previous design tools) is its use of visual representations to guide the design process. The physical artefacts of the tool help teams to build shared understandings and designs. The use context is also suggested, but not limited, to the use of DEMO in the early design phases. Through an iterative process, DEMO uses cards to inspire teamwork in order to produce designs, concepts and other artefacts related to motivation. Roles are optional and should be adopted as necessary to gain a multidisciplinary perspective. The process of utilising DEMO includes, first, a preparation phase, during which the objective(s) to design for motivation (i.e. who is the target user, what should be achieved, why there is a need to achieve it) is set before the workshop. The group also needs time to clarify goals, gather supportive material and become familiar with the functionality of the tool.

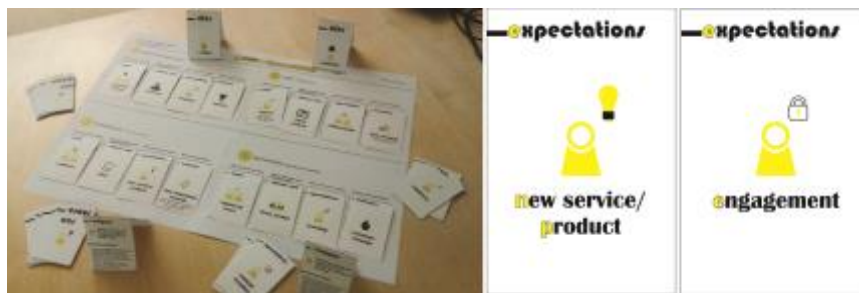


Fig. 1. The DEMO tool with two examples of cards.

### 3.1 Design of the template

The design of the template was based on a stepwise process inspired by the reviewed tools (Table 1) and other DT/SD tools. Important and common steps among the previous design approaches, such as the description of the user and experience, were embedded in DEMO template. This template helps the team define the important aspects of the design process: the objective, the user, the experience and the motivation. Participants must describe or clarify the objective to design for motivation, as appropriate; the user is the subject of the design for motivation; experience refers to the general user experience through the innovation platform in relation to the motivation; and, finally, the motivation refers to motivational mechanisms that could be employed by the innovation platform. The flow of the steps and the number of step iterations are decided by the team. The template is used as a design and information space that supports the collaborative reflection and inspiration through the steps. When printed in a large paper format (preferably A0 or A1), the template and the cards assist the participants in navigating through the process of developing a design plan and help them to include all information essential to the group discussion. As has been shown in related work [5; 6], tangible tools

provide collaborative spaces for conceptualising complex concepts with simple, traditional means (e.g. pen, paper).

### **3.2 Design of the Cards**

The cards are inspired by previous card-based design approaches [20; 10] and gamification concepts. Specifically, the cards are designed to inspire the group discussion, with relevant topics and group reflections. Four card categories, namely people, methods and tools, resources and expectations, aim to clarify further each step. The cards for “people” specify who (e.g. industrial partners, users or administration) should be involved in a particular step. The cards for “methods and tools” specify which methods and tools (e.g. personas, qualitative data or surveys) should be used in a step. The cards for “resources” specify which resources (e.g. the platform, policies or points) are needed to complete a step. Additionally, the cards for expectations specify what the expectations (e.g. feedback, learning or new product/service) are for each step. The cards serve as supportive materials for helping the group complete the stepwise process, while the two levels of the cards fit the group’s objectives. This means that general-purpose and specific-purpose cards can be sorted according to whether a group’s objective is general (e.g. develop a strategy to motivate users) or specific (e.g. develop a user interface component for user motivation). General-purpose cards include more broad concepts, such as users (in category: “people”) and qualitative data (in category: “methods and tools”), while specific-purpose cards include more explicit concepts, such as points (in category: “resources”) and new product/service (in category: “expectations”). Furthermore, blank cards can be filled with pertinent information and short explanations for some of the cards are included. Let us consider an example to illustrate the role of the cards in the process. A group begins by describing the objective (why to design for motivation). “People” who might be involved in further specifying the objective could include business partners, employees, the IT department, registered users, etc. “Methods and tools” to better describe the objective might include personas, surveys, questionnaires, qualitative methods, interviews, etc. Other “Resources” that are necessary to define the objective could include the innovation platform, related policies and documents, etc. Finally, the “expectations” of this step could be to create a list of requirements or a strategy to proceed with the following steps. For each step, the same set of cards is used (and re-used as needed), without any limitation on the number of cards.

### **3.3 Roles**

The roles are inspired by previous work on design tools [32], DT research[7], participatory design approaches [6], and game-like approaches [5]. The roles have two primary purposes within the process. First, the roles support the participants’ engagement in a “gamified” role-playing process, and second, they ensure the participation of several perspectives during the workshop. The roles include: the “facilitator”, the “designer”, the “developer” and the “manager”. The “facilitator” is a



process-oriented role that aims to determine the best possible outcome for each step by balancing group dynamics. The “designer” is a design-oriented role that focuses on how to implement the outcome of each step. Designers, who may be interaction designers, service designers or interface designers, need to be able to communicate and define concepts from the other “roles”. This means that any given design concept should be visualised in different ways, as necessary, to facilitate the understanding of all participants. Designers usually work with several different tools, most of which are visual, depending on the workflow. The “developer” is a technical role that focuses on how to develop the outcome of each step. Developers have their own tooling needs and usually work with software to test code or build engines or libraries. Lastly, the “manager” is a management-oriented role that focuses on how to organise and deliver the outcome of each step. Managers are characterised by a high level of practice and are comfortable working with a wide variety of different tasks. It is important to note that these roles are not exclusive and that participants may shift between roles depending on the competencies of the group. Other roles that are useful in such workshops could include the roles of “psychologist” and “end user” [30].

#### **4 Usability Evaluation of the DEMO tool**

To ensure the usability of the tool, a group-based expert evaluation method was organised to identify potential usability problems related to the DEMO tool. The evaluation concluded by identifying both overall usability problems and ratings of severity. Potential problem areas related to design, experience with the tool, functionality and interaction with the group were examined. Nine experts, both men and women, with expertise in HCI (median of 17 years of experience), in interaction design and the design of information systems (IS) (median of 12 years of experience) and PhD students in informatics, HCI and interaction design (median of 5 years of experience) were participated in usability evaluation. The evaluation procedure included a short, 15-minute introduction to the main goals of the study and the DEMO tool. Then, the groups were introduced to a case scenario. After the general description of the tool, the participants were given some time to familiarise themselves with the tool. The group discussion began with a delegation of roles among participants. The group interacted with the tool and each other following the stepwise process. After one hour of interaction, a short discussion of the process and the tool was conducted. Lastly, the participants were invited to fill in individual evaluation reports, consisting of questions about the stepwise process, the four parts of tool (template, cards and roles), the perceived outcomes of each step and their general experiences with the tool. The evaluation report included open questions, while participants were asked to rate the severity of usability problems using a 5-point scale. No personal data were collected. The total duration of the usability testing session was approximately 2 hours.

## 5 Discussion - Conclusions

The preliminary evaluation of the tool showed that the overall experience with the tool was positive, while some usability issues were uncovered. The expert evaluation was proven to be an effective method for assessing the usability and improving DEMO's design in the early phase of development. The participants, with their different fields of expertise, contributed a diversity of insights into usability problems. Specifically, the experts commented on usability problems and explained their concerns and limitations in detail, either in their reports or in the discussion following the usability session. The majority of researchers went beyond simply pointing to usability problems by suggesting how different problems could be solved in practice. Furthermore, group dynamics played a significant role in the outcomes. Balanced group dynamics can be achieved via roles-in-turn, time-limited discussions or an experienced facilitator who ensures collaborative work.

An important lesson when designing for motivation concerns conceptual models. The concept of motivation is abstract and complex, leaving significant room for misunderstanding. This can be clarified with description of motivation theories, examples of concepts and description of related case studies. In general, the tool incorporates concepts that could be applied to different projects related to design for motivation in or beyond innovation communities. General-purpose and specific-purpose card concepts inspire teams and support group-based discussions and conceptual modelling related to motivation. A good balance of abstract and specific concepts is needed in order for the tool to be flexible and applicable to diverse projects. With two levels of analysis—one at a general level, in which basic conceptualisations of motivations, objectives, users and experiences are described, and one at a specific level, in which more specific conceptualisations of same steps are described—the corresponding cards will have clear roles in the process. Gamification has the potential to be better embedded within the design tool and better connected to motivation theories. Examples from both the practical application of theory and applied gamification elements will support a better understanding. The participants' previous experiences working with their groups helped them to build conceptual models, however they were challenged to build a concept for an artificial scenario within limited time. In the future, more time for preparations is needed, primarily in relation to the concept of motivation, and maybe in combination with other creative methods. In addition, the tool should be more flexible to adopt a group's creativity by embedding relevant creative methods, such as brainstorming, storyboards, mind mapping and many more. Also, the word “steps” is relatively problematic, since this led to the tool being interpreted as a strict, sequential process rather than as a suggested path. Future evaluation of DEMO may involve evaluating the different aspects of the tool separately, sorting out the cards or evaluating the tool's creativity and innovation issues, among others. Furthermore, the expert evaluation of the DEMO could be extended in later evaluations via expert evaluations with multidisciplinary groups of experts (e.g. psychologists, game developers, or innovation managers), as well as evaluations of the design outcomes following the use of the tool.

Design for motivation is a complicated process because of the involvement of many activities and challenges. Thus, it is required to use tested tools and methods that can be applied in diverse projects and employed by multidisciplinary teams. In this paper, a design tool called DEMO was introduced. The main contribution of the paper lies in the presentation of the DEMO tool and its parts. The novelty of DEMO is the fact that it provides a structured and game-like approach to designing for motivation. Potential benefits of using the DEMO tool are twofold: it presents a structured and visual approach involving steps, physical material (cards) and roles (which engage participants in a role-playing activity) within a “gamified” process in designing for motivation; it has been practically tested in usability sessions. A second contribution of the paper concerns the usability evaluation of the tool.

Further work and research should focus on applying the design tool in diverse cases of innovation communities and various application areas. Case studies that report in detail efforts to develop and design for motivation in specific cases are needed. The application of additional methods will reveal more usability and design issues and, thus, inform the design of the tool. Interviews with multidisciplinary groups of participants, observations and surveys with end users are a few examples of additional methods that could be used. Practitioners will find this paper’s discussion useful for practice. Practitioners may benefit from design guidelines for how to design for motivation based on this tool. Finally, an online version of the tool might be useful for workshops with remote team members.

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