A Canvas Framework for Gameful Design Concepts

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Abstract
Elaborating effective gameful designs efforts a deep understanding of game design elements and "game literacy". The most gamification endeavors are therefore very complex, especially for individuals with less experience in game design. The research results of the project EM-PAMOS provide a toolset and a pattern language with high potential for developing new concepts for gameful designs that foster motivation ("gameful motivation") in diverse contexts, but at the same time demand for an elaborated design process to create these concepts meaningful and tailored. Thereby, it is crucial to find out how to make use of potentials of game design elements and how to find a structured way to choose and combine them to new gameful design concepts, embedded in the context and accepted by the target group. This paper presents a framework consisting of four canvases for the systematic AI-aided development of gameful design concepts. It considers the use of existing likewise the inclusion of new game design elements as well as element combinations. In particular, the canvases lead game designers through an iterative process of briefing, exploration, creation and fit. Using a design-science approach to research, this paper shows how the canvas framework is iteratively developed, applied and evaluated. The designed artefact, the macro-canvas, enables gamification designers to systematically analyze, improve and develop gameful design concepts by bringing target groups, target behavior, context and game design elements together in one compact framework.

Keywords 1
Design Science, Canvas, Misfits, Gameful Motivation, Game Thinking

1. Introduction

The use of game design elements has an enormous potential to create new motivational designs and innovations in various contexts (business development, culture, social work, education, government) and on diverse levels (individual, team, organization, environment). Opposite to a lot of innovation methods that focus on the development of products and services with a predominantly technological or business focus, methods that work with game design elements – commonly described as gameful design or gamification [1] – consider the motivational needs and behaviors of people and their interaction with each other. Working with the game metaphor allows to integrate elements of collective fun, voluntariness and self-motivation into a design process. In other

words: The expected outcomes of the most innovation methods are new products and services with interaction and motivation as a value added. The expected outcomes of gameful design methods are new ways of interactions and (self-)motivation, usually delivered as the core of a product or service (in a broader sense) [1]. Thus, it can be concluded that gameful design concepts foster real *social* innovations [2], mostly in form of motivational innovations.

For this reason, working with game design elements should not be reserved for the gaming industry and professional game designers, but be accessible for diverse professionals in the social, cultural, educational and business sector.

In order to establish this, it is important to become acquainted with "game thinking" or "game literacy" to work with game design elements and to apply the right vocabulary and mindset.

The project EMPAMOS [3,4] has analyzed games in the German Game Archive, the biggest collection of boardgames, and lifted round 100 game design elements and 25 so-called game design misfits. They were taken together with methods into a game design toolbox that enables individuals and teams with different levels of game design expertise (from the first use of game elements to the professional work in the game industry) to create effective and fitting gameful design concepts. These concepts consist of game design elements that are provided by an empirically buttressed collection. Additionally, the project explored the connections of game design elements. Combining game design elements leads to specific configurations that help to generate solutions that are as a whole more than the sum of its parts. Configurations of game design elements can be conceived as "game design molecules" analogous to chemistry, where several elements form molecules. If these molecules are again connected with each other, they form greater clusters of game design elements that can be conceived as "game design networks". These terms base on the concept of Christopher Alexander's pattern theory [5,6] that was applied on game design firstly by Björk and Holopainen [7].

However, as useful a collection of game design elements in form of a pattern language is, it still affords the learning of new concepts and competences in multiple dimensions. For instance, it is necessary to learn and understand all game design elements as a vocabulary, to comprehend the concepts (e. g. that of game design misfits), to moderate a creative team and to apply the right methods. Applicants of a pattern language have to cope with both, the complexity of the practice case they want to tackle and the newness of the method. In such a situation, it is helpful to have a structured design process and the documentation of a concept development for all parties involved. A structured process and a visualization of the connection of game design elements helps unexperienced innovators as well as game design experts to wield this complexity. The development of a common method and process of the implementation of game design elements into non-game contexts is also helpful for gamification researches, as it provides an easily comparable step-by-step structure and empirical evidences for gamification projects that can be conceived by analyzing the artifacts of the process. These artifacts can be provided by canvases. Canvases are conceptual structured templates that show the connection and the interrelatedness of complex process steps and concept

parts on a two-dimensional surface. This visualization helps to perceive a complex topic and follow a predefined design process intuitively.

The process of EMPAMOS ameliorates the design process and tackles certain shortcomings in recent gamification approaches. First, the simple superimposing of elements on a context to make it more superficially pleasing ("chocolate-covered broccoli") [8] is prevented by the intense analysis of existing elements in a context. Second, by establishing the concept of game design misfits a bridge is offered between the (motivational) problem faced and the subsequent choice for certain elements.

Third, the ideation phase of the development of gameful design concepts is assisted. Morschheuser et al. [9] found out that the creative ideation phase in particular is not methodologically covered, as it mostly relies only on creativity methods such as brainstorming. Mora et al. [10] show in their literature review that several gamification frameworks try to integrate the essential core concepts of game design into the gamification process, for example by referring to the MDA framework [11] or Schell's Game Lenses [12]. Deterding positions his concept of skill atoms also as "brainstorming triggers" [13]. But, gamifiers are still looking for a methodical answer to the question of which game design elements must be selected with regard to the users' motivational needs. A related, equally important aspect is, how game design elements have to be combined in order to address these needs precisely. It is hence not surprising that gamification designers today still rely on points, badges, and leaderboards, and that many of them will be reluctant to use the full variety of game design elements due to uncertainty and risk aversion [14].

Fourth, the careful and iterative check of context, target group and behavior in a FIT phase allows for sustainable motivating concepts that preclude "motivational straw fires" [4].

The following sections give more information about the underlying project EMPAMOS, explain the theoretical foundation for the creation of design canvases, the research method and the explanation of the canvas framework as an artefact of the research. It concludes with the application of the framework in practice contexts and the limitations and implication that can be concluded therefrom.

2. The project EMPAMOS

In the following, the basic building blocks that are necessary for the specific design process will be introduced (see [3] and [4] for details). These have been worked out in the context of the EMPAMOS project.

The project consists of two phases, where the second is an ongoing progress. EMPAMOS uses the German Games Archive, which contains today about 40,000 games. In the first project phase, the games were qualitatively researched by playing 208 games and searching for recurring patterns in them. From these patterns, 97 game design elements were described and their occurrence documented with a total of 4,206 text annotations in 961 games and their text instructions. Starting from this empirical basis, the second phase was focused on the quantitative analysis of the games. We trained machine learning algorithms to automatically recognize the game design elements in the text instructions [3]. By February 2022, a total of 49,135 pieces of empirical evidence had been found to support the use the game design patterns within 8,300 games. This catalog of empirically proven connections shows how game design elements are combined in games to solve motivational problems. This creates a pattern language for game design analogous to the work of Christopher Alexander in the field of architecture [5–7].

Further, the analysis was not restricted to game design elements but also took so called misfits into account. Whereas game design elements are very common in the gamification literature and practice, game design misfits are a new form of patterns, namely circumstances that render games dull or less (re-)playable. Game design misfits were revealed by counterfactual reasoning via mental removal: What would happen, if a game design element was missing in the game? Which negative effects, such as boredom, imbalance or ambiguity, are kept in check by the elements? These negative circumstances were documented leading to a set of 25 different game design misfits.

A first artefact of this research is the game design toolbox. It contains the game design elements and misfits as playing cards supplemented by methods to apply them in order to create concepts that use game design elements to foster motivation. To dissociate clearly from the merely superimposing of game design elements on a context, the term "gameful motivation" as alternative to "gamification" was established. It should make clear that motivation is not generated by a manipulation of the target group by exposing them to game elements, but by helping them to motivate themselves with the power of gameful design.

A second artefact, the EMPAMOS web application, allows for a more rational and calculated approach: Game design elements, misfits and their connections are in turn the basis for another machine learning algorithm that can suggest further elements in case of a certain incidence of game elements, misfits and connections. These suggestions of the web application allow users to structurally find out new connections and elements for a game design network [15].

To wield these powerful tools, it was necessary to develop a structured, logical and comprehensible design process that helps implementing the game design elements into non-game contexts.

The present paper consequently asks the following research question:

How can the empirically developed game design patterns be used to systematically develop meaningful and tailored gameful design concepts as solutions for motivational problems?

A framework for the systematic development of gameful design concepts is therefore designed and evaluated.

3. Concepts behind the design process

As a conceptual foundation, we draw a promising analogy to another discipline, which uses design-based processes and canvases frequently, namely entrepreneurship and value proposition design. The gamification process can be seen analogous to a business [16]. Just like entrepreneurs, gameful designers have to deal with a complex environment, have to analyze the needs and pains of their target groups and need to work iteratively on a product or service, which is in our case a gameful design concept.

Three important conceptual frameworks from entrepreneurship and value proposition literature were used as theoretical piles for the conception of the canvases: the design thinking process, value proposition design and the use of canvases as a design tool.

3.1. Design thinking and digital innovation

Design thinking can be conceived as a human-centered approach, toolset, mindset and strategic principle [2]. As a toolset it can itself make use of gamification and gameful/playful methods, such as Lego Serious Play [2]. As an approach and process it can inspire the process of game design generation.

First and foremost, human-centeredness, empathy, visual communication and interdisciplinary co-creation are fundamental design principles that design thinking and our approach to game thinking have in common [17–19]. Besides this, three main features of the design thinking process were important for our conception: the macro framework of the process, the specific process segments, and their iterative connection.

The macro framework of the design thinking process is commonly described as "double diamond", which means that there are two main spaces (diamonds). The first is the problem space, the second is the solution space. Each of the spaces has a divergent phase and a convergent phase. In the divergent phases the space is opened widely and deeply to generate a lot of opportunities. In the convergent phases the space is streamlined and focused [17]. Between the two diamonds lies a "point of view", where a "how might we … ?" question is formulated that guides the solution generation. Hence, a design thinking macro process consists of discovery, definition, development and delivery [17].

Based on this macro structure the design thinking process is divided more or less fine-grained into phases, depending on the grounded model. One common model is described by the Hasso Plattner Institute and contains the phases "understand", "observe", "point of view", (first diamond), "ideate", "prototype" and "test" (second diamond) [20].

Specifically, the process for the present canvas framework was inspired by the EXPLORE-CRE-ATE-EVALUATE model from the innovation agency Dark Horse [21]. Their process adapted the build-measure-learn circle by Ries [22] for challenges in bigger organizations.

All process models have in common that despite their definition of concrete steps, they do understand a process not as linear, but as iterative. Hence, it is possible and even necessary to go back and forth between the phases and inform preceding phases with data from later stages. Hypotheses and critical assumptions are formulated, tested, validated or dismissed, which is again outset for new hypotheses.

Design thinking is an approach to generate human-centered and innovative artefacts that can be products and services. If game design concepts are understood as innovations based on the interaction and activity of humans, an even more specific discipline in the context of digital innovation and design thinking is applicable, namely service design [23,24].

3.2. Value proposition and service design

From the perspective of a product-dominant logic game design elements gamify products or services. In this view, gamification has the role of a feature, value-added service or annex to the value proposition. In contrast, if gameful designs are conceived as service systems with regard to a service-dominant logic ("S-D logic"), they are themselves the value proposition [25,26]. Gameful design concepts have more in common with service systems than with products, as they are usually intangible, based on knowledge and relating to activities. The representatives of the target group are part of the service and integrate their views and perceptions co-creatively [26]. In a gamified setting, not the product or its feature, but the activities of the individuals are a source of value [27]. Gamification concepts are therefore not only social innovations but also service innovations.

When it comes to developing services, the literature recommends starting with the value proposition first, as it is the core of the offering [27]. Hence, value proposition design seems to be promising as a key for the design of new gamification concepts. A very common framework for the design of value proposition is provided by Osterwalder [28]. Here, a value proposition is segmented into users' pains, gains and jobs to be done, that are mirrored by pain relievers, gain creators and features that a value proposition has to offer.

Design thinking and value propositions in service design benefit from a visual approach to discussion, idea and prototype generation. Therefore, canvases as visual design tools are very promising.

3.3. Canvases as a design tool for gamification

Canvases are visual design tools to capture insights, track hypotheses and discuss concepts within a team. One of the most known canvases in management and information technology is the business model canvas by Osterwalder [29]. Canvases relate to the design science approach as they help to create artefacts visually (in opposite to a pure verbal documentation). This helps to perceive complex ideas more quickly and intuitively, creating a basis for discussion that can be changed flexibly. Interviews with gamification experts in a study of Morschheuser et al. [9] reveal that canvases are already frequently used in gamification projects.

A research into gamification canvases showed that there are already tools, such as the *Gamification model canvas* [30,31] that bases on the business model canvas by Osterwalder and combines it with the MDA framework (mechanics, dynamics, aesthetics) [11]. This was also further developed to a *Lean Gamification canvas* [16].

Although the MDA framework offers a useful structure for gamification projects, the canvases presented here provide an alternative way of structuring by the game design pattern language. They play on the level of game design elements, whereas the MDA framework plays on the level of overall, middle-range concepts of a gamification model. Furthermore, the gamification model canvases do not allow for the inclusion of game design misfits and the service design thinking process is insufficiently mapped. Therefore, our objective was to create new game design canvases for meaningful and tailored concepts.

4. Research method

Based on the data of EMPAMOS, the artifact developed in the present study is a canvas framework for the design of game design concepts. The artifact is evaluated through its application in EMPAMOS workshops and work with customers.

Thereby, this paper is following a design science research (DSR) approach [32,33]. Originated in information systems and design research, DSR is a promising approach to advance the development of design processes and therewith social and service innovation such as gameful designs. DSR is considered as a suitable approach due to its focus on designing methods and frameworks for the development of new solutions for complex problems.

DSR includes the evolvement of new artefacts. While gamification practitioners may create new gameful designs that solve specific motivational problems for a target group in a specific context, DSR generates novel models and frameworks that advance the process of game design through iterative circles of conceptualization and validation.

DSR encompasses two main activities that are performed iteratively: building and evaluating [34]. In the building phase, a new artefact is constructed. The evaluation phase assesses the performance and fit of the artefact. Both processes require an iterative approach which involves design science and social science [32,33].

According to Peffers et al. [32], a DSR research project can be divided into six steps: (1) identification of problem and motivation, (2) definition of the solutions objectives, (3) design and development, (4) demonstration, (5) evaluation and (6) communication.

The *problem* was identified in the practice of the application of EMPAMOS methods, where we became aware that individuals faced with the game design toolbox appreciated its value and potential but struggled in learning and applying the methods. That motivated us to lower the complexity and provide applicants with a structured framework.

The overall *objective* of the canvases is to support practitioners in their gamification projects.

The third step, *design and development*, was done within the interdisciplinary research team with backgrounds in business informatics, system theory, gamification and entrepreneurship. In several workshop sessions, the canvases were iteratively sketched and optimized. Experiences from former EMPAMOS workshops with more than 70 participants from the business, cultural, social and educational sector ensured a link to the practice. In sum, it took five iterations to create the first versions of the canvases. First, the four steps of the process were defined. Second, the most important concepts and terms were collected and mapped to the process steps, third the team decided for a rough order of the fields, fourth the canvases were separately designed. Lastly, the team gave each other feedback to the current draft of the canvases, suggested further scales, reformulation of terms and rearrangement of fields.

The *demonstration* of the canvases happened by the concrete application in four gamification projects, where customer of EMPAMOS (a therapy software provider, a publishing house, a e-

learning platform and an economic promotion agency) were let through the whole process in two or three workshops each. Additionally, the canvases were implemented in EMPAMOS workshops and used by 17 advanced participants to develop their own gamification models. The project team documented their usage of the canvases as visualization and consulting tool. After each workshop with the clients the team held a reflection meeting where thoughts were collected about what worked well and where the canvases should be adapted. The reflections were stored in a common working platform and led to new iterations of the canvases that were used and tested in the next project.

Whereas the success of the assignments were first hints to the positive *evaluation* of the canvases, subsequent interviews with the customers and the participants gave additional qualitative data for the evaluation. They were asked whether they could understand the process clearly and if they had questions at certain steps. In the first project with the therapy software, the client was asked to write down the concept in their own words, so that the team could estimate whether the principle of the canvases was free of ambiguity. A discussion with the clients about the results of the workshops revealed further insights, how to clarify the procedure. For instance, the ranking of the motivational dimensions in the EXPLORE phase offered several interpretations. The team had to clarify which questions are to pose at this point and how the fields are connected with each other. This led also to a manual that described in detail how the canvases are meant to be used. The manuals were again presented to the workshop participants that wanted to learn the method by themselves. By assessing and discussion the game design concepts of the participants that were created with the canvases, several more iterations of the designs were made.

Finally, the canvas is going to be *communicated* in the scientific communities by research papers and conference talks.

The next section introduces the structure of the canvas framework.

5. The canvas framework

Figure 1 gives an overview of the whole EMPAMOS design process, which should be facilitated by the canvases.
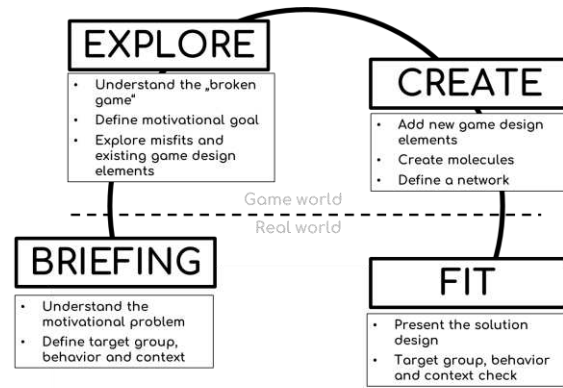
Figure 1: EMPAMOS Design process

The design process from design thinking and the double diamond model propose a procedure consisting of *discover, define, develop* and *deliver*. Therefore, first of all an exploration phase for the analysis of the setting is important for a design concept. After exploration, the context and the target groups are concretely defined and understood, which transfers to the phase of creation. At the end of the process the concept has to be implemented and evaluated. This was mapped with the three phases EXPLORE, CREATE and FIT. The FIT phase is positioned before the implementation and has to check whether the network actually fulfills the target of the project. It transfers the game design concept from the game world into the real, non-game world and is therefore the exit of the process. On the start of the process, it is also important to give an entrance from the real world into the game world. Therefore, a BRIEFING phase was positioned before the EXPLORE phase. It represents the "zeroth diamond" in the double diamond model and makes sure that the assignment for the project is concretely clarified using the language of the non-game world.

In the following the creation of the four canvases is explained with more detail.

5.1. BRIEFING

BRIEFING relates to the project preparation and the analysis described by Morschheuser et al. [9]. According to their literature review and exchange with experts, the context is often less emphasized in gamification projects. The BRIEFING alleviates this common shortfall by allowing for a closer look at three important piles of each gamification project: 1) target group, 2) context and 3) target behavior.

A deep analysis and clarification of the target group is strongly emphasized by design thinking

and value proposition design. Many gamification projects fail because of an incomplete definition of the humans that have to benefit from the game. The BRIEFING phase demands a definition of the target group(s) and their description by facts (age, demography) and emotional, cognitive and personal needs. At this stage, the value proposition canvas by Osterwalder [28], user interviews and personas help to list up facts about and traits of the people that have to be motivationally affected.

As important as the target group is the context that is going to be gamified. A certain behavior of a certain target group depends strongly on the specific context, e. g. if it is a vocational or private setting. The canvas requires to define important key data about the context. In the evaluation through the DSR process, the research team found out that not only the context of the target group, but also the context of the project have an influence on the gameful design. The former describes aspects such as stakeholders, organization, processes, branches, the latter focusses on data about the boundary conditions of the project, such as time, space and budget of the assignment.

Target group and context together make up the situation that is targeted by the project. A target group shows in a situation in a given context a certain behavior. This central field of the BRIEFING canvas compels to define the *observable* target behavior that should be achieved by the project. Here, we provide a continuum loosely based on the behavioral grid by Fogg [35]: Two poles are the most challenging in this nexus: To cease an undesired behavior or to rise a new desired behavior. Apart from this, a designer of gameful concepts can decide to decrease an undesired behavior or to stabilize or increase a desired behavior that is already shown by the target group. Making clear and unambiguous decisions at this point helps to improve the feasibility and the fit of the game design network.

Based on the notion of realities as "broken games" [36], the BRIEFING phase ends with the question, what is actually the broken game to be repaired: Who should be motivated for which behavior in which context? The broken game can be seen analogous to the "wicked problems" that are starting point for design science and design thinking [2,37]. Figure 2 shows the final BRIEFING canvas.
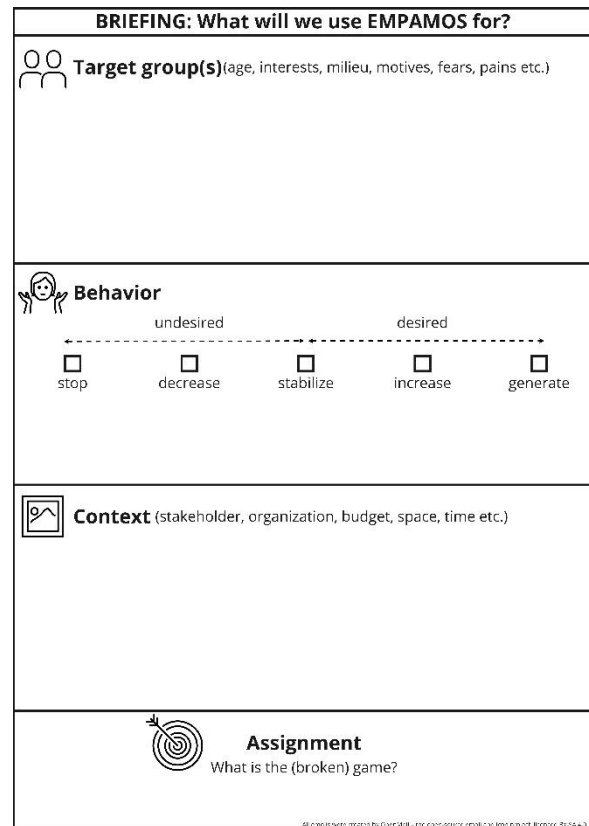
Figure 2: BRIEFING canvas

5.2. EXPLORE

The EXPLORE phase reveals the assets in the context and the target groups and sets the stage for the gameful design project. It precedes the ideation phase, which is assessed as to some extent blurry in current gamification practice [9]. Here lies one important difference of the EMPAMOS approach in comparison to other gamification design processes: Instead of starting immediately with creative ideation (e. g. with brainstorming), the EXPLORE phase firstly analyses the context and the target group as if it was already a game – an incomplete game that is poorly designed, therefore lacks motivation and engagement and feels broken for the target group as its players. Information from the real world in the BRIEFING is transferred into the game world and translated into game language created by the game design patterns. This procedure is important for individuals with less game design or gamification experience, as it helps to look at the familiar context through "game glasses". The EXPLORE phase identifies the misfits and analyses existing game design patterns in the situation, understood as a "pantry": Which elements are already there and can function as a basis for the concept?

A first question in the EXPLORE phase is whether the game design network is going to lift a current status to a next level and to exploit potential (chance) or whether a desired state, which is missing, is to be established (problem).

Based on this, the motivation goal can be determined. The game designer has to assess, which motivation dimension is key for the target group (in case of a chance) or in which dimension the biggest deficits are (in case of a problem). The dimensions are based on self-determination theory (*competence, relatedness, autonomy*) [38], supplemented by the dimension of *meaning* proposed as a supplemental dimension by Rheinberg [39]. At this important step the user of the canvas has to prioritize what kind of motivational effects the gameful design should create. This gives another clarification and concretization for the ideation and makes sure that the concept tends in the right direction.

The next step deals with the game design misfits, which are provided as playing cards by the toolbox. Based on the insights about the target group and the context the current situation is analyzed concerning existing misfits. Problems and challenges that render the non-game context a broken game have to be analyzed and transferred into the game world by building analogies. This gives first findings, why the current situation is demotivating or why the target behavior is not observable. The misfits can also be classified into context- and behavior-related misfits and how intensely they occur, thereby leading to a first mapping of the broken game in terms of potential for game solutions.

Analogously, the existing game design elements in the context can be analyzed and structured. By looking through the "game glasses" aided by the game design element card deck, the designer can transfer non-game features of the context into the game terminology. Hence, they recognizes the existing game potential in the project and what the target group is already familiar with. That makes it easier to build gameful design concepts that are rooted in the context and are accepted by the target group preventing the "chocolate-covered broccoli" approach. This view into the "pantry of game elements" is neglected by other gamification processes so far.

Game design elements can also be behavior-related or context-related – and they can have positive or negative effects in the current situation.

The EXPLORE phase ends with a hypothesis concerning the chance or problem that sums up the insights from the transfer and catches the functionality of the current (broken) game. Analogous to the "how might we …" question in design thinking, this hypothesis clarifies the target and finalizes the definition.

Figure 3 shows the EXPLORE canvas.

Figure 3: EXPLORE canvas

5.3. CREATE

Not until then follows the CREATE phase that is the ideation part of the process. It uses the artefacts (misfits and existing elements) as the outset for a holistic framework. In the CREATE phase three levels in a continuum between intuition/randomness and rationalization/calculation are possible: The most intuitive and most random approach is to just draw cards from the pile of game design element cards and to intuitively decide, whether the game design element fits for the concept and connects with the other elements or not. The most rational and most calculated approach is the use of the web application, where an algorithm suggests new elements based on artificial intelligence. Between these two extremes are other methods, such as the design along predefined concepts, e. g. the control loop from "assignment", "action", "story world" and "reaction" [40], process models or

player journeys. Concepts such as the *Gamification model canvas* or the MDA framework might also be helpful scaffolds at this stage. These methods will come up with a great number of new game design elements that have to be connected with the existing elements. They will also cluster with each other and build higher-order configurations (molecules). Molecules are game design elements that stick together and influence interaction concordantly. The final game design network is lastly defined by the different molecules that came to existence.

At this stage, the value of the pattern language becomes obvious. Ideation phases are inherently demanding, as diverse ideas and thoughts with different levels of maturity and abstraction have to be collected, clustered, ordered and streamlined. Especially in teams, where various perspectives and experiences clash, these tasks are challenging. In the worst case, the sheer infinity of possible solutions stifles creativity. The pattern language restricts the potential parts of the solution to the round 100 game design elements. Every element has a number that can be notated on the canvas. This leads to a common language in a team and structures thoughts. Having the choice among a collection allows to order the thoughts of the explorative minds and inspires those who are not good at retrieving ideas out of nothing. Hence, by pinning the elements at the canvases (for example with sticky notes) and rearranging them together, the ideation phase becomes more efficient.

Further, elements can be transferred from the EXPLORE canvas to include also the pantry elements.

The CREATE canvas formulates a solution hypothesis and is shown in Figure 4.

5.4. FIT

The last phase, FIT, immerses into the real world again. It stands before the prototyping, implementation and evaluation of the game design network and checks, if the game design network matches with the objectives, the target group, context and behavior defined in the BRIEFING phase.

The target group fit looks back at the target group from the BRIEFING and the motivational dimension from the EXPLORE canvas. It is meant to analyze the whole network, if it addresses the target group's needs, pains or gains and whether the target motivation dimensions are

really tackled by the concept. E. g., it might happen that the concept is very thoughtful and creative, but does lead to strong relatedness, whereas the target group actually strives for autonomy.


Figure 4: CREATE canvas

The behavior fit looks back at the target behavior and the misfits and checks, whether the targeted desired or undesired behavior is actually stopped, decreased, stabilized, increased or generated by the network. Additionally, it tests for eventually occurring new misfits that arise from the solution.

Finally, the context fit checks the boundary conditions defined in the context field in the BRIEFING phase. It also examines whether the game design elements already present in the pantry and the new game elements work well together or, alternatively, whether they lead to new disruptions. This might be the case, if there is an inappropriate balance between the game design elements already present in the context and the new game design elements. New game design elements have to be carefully embedded into the context.

The FIT phase closes with the first considerations concerning the implementation of the game design element network, starting with features of a potential prototype that can test the solution.

Figure 5: FIT canvas

After this conceptual design work, the implementation, evaluation (e. g. by user testing) and monitoring has to follow to finalize the gamification process [41]. However, the EMPAMOS design process stops at this point, as the pattern language with its game design misfits and elements have defined the building blocks of the solution. The implementation bears different challenges that have to be tackled, but they go beyond the scope of the search for the right elements. However, it is always possible to come back to the FIT phase and check, if the concept harmonizes with target group and context. Here again, negative feedback by users can be analyzed with the game design misfits. It might happen that a gameful design concept produces new misfits that were not considered before the process. Based on the knowledge about combinations, game design elements that show negative effects could be easily substituted by alternative elements.

5.5. The meta canvas

All four canvases can be filled-out step by step and stand for themselves. Furthermore, all four taken together create a meta canvas, where the upper, the middle and the lower parts are horizontally connected (see dotted lines in Figure 6).

These four horizontal "streamlines" make it possible to jump back and forth in sense of the iterative procedure. The upper part deals with the target group: In the BRIEFING canvas, their facts and traits are retrieved, in the EXPLORE phase their motivational needs are analyzed in the game world, the network of the CREATE phase describes the surface of the concept that is addressed to the target group, checked finally by the target group network FIT.

The middle part of the meta canvas deals with the behavior that is shown when a target group meets a certain context. Whereas the BRIEFING canvas defines the target behavior, the EXPLORE phase identifies current negative influences on the behavior with a game perspective, followed by concrete molecules of game design elements in the CREATE phase that should keep these misfits in check or decrease their effects. By checking the behavior FIT, these assumptions are tested.

The second lowest part of the meta canvas is concerned with the context, as it starts with the boundary conditions in the BRIEFING phase. The EXPLORE phase identifies game design elements in the context and transfers them into the CREATION phase, where the context is enriched by further game design elements. These are again tested via context fit in the FIT canvas.

Lastly, the lowest part of the meta canvas summarizes the whole project.

The whole canvas can be traversed like a large playing field, with different methods helping to move from section to section. For beginners a recommended path is provided (see dashed line in Figure 6), experts can also shortcut at certain points with more complex methods.

6. Application and Evaluation of the Canvases

To proof the canvases in practice, the following sections illustrate three occasions where the canvases were used. Two of them are assignments, where a customer asked the research team to design a gamified service. The closing occasion describes, how participants of the EMPAMOS design workshops worked with the canvases.

6.1. Application for a sleep therapy software

A provider of a therapy software for people with sleep disorders asked the EMPAMOS team

to integrate game design elements into an online therapy process. The users of the software have to go through a process about several month, where they have to fill out questionnaires and dairies about their sleep, supplemented by message exchange with a personal counsellor. The dropout rate in this process was rather high. Therefore, the objective of the project was to decrease an undesired behavior, namely the exit during the process. The BRIEFING canvas helped to clarify this objective, as focusing on the undesired behavior affords other concepts than the opposite, i. e. increasing the interaction. The EXPLORE phase helped to define concrete motivational needs (competence, relatedness) and identified three core misfits (e. g., "game is hard to win", because external circumstances, such as the work conditions, decrease the therapy effect). The exploratory discovery revealed that many game design elements already exist in the context, such as *arrival, player progress bar, collecting* or *positive event.* Most of them already had a rather positive effect, which was not exploited so far. In order to raise their potential, they were supplemented by new elements, such as *play phases, game progress bar, feedback, avatar* and *badge.* With these elements, four interesting molecules could be created: a clear positioning via progress bars and arrivals, a storytelling molecule consisting of an avatar and a story, a passion for collection molecule that enriched the dairies that could be collected by badges and fourth, a cooperation molecule, where the interpersonal connection between client and counsellor was deepened by positive collective events and feedback.

In this case, the canvases were filled out together with the customer. The concrete briefing helped to clarify the assignment and the visualization of the network was a foundation for deeper discussion of the game design concept.

6.2. Application for a publishing house

A more complex network was created for a publishing house that wanted to develop a software for pupils who are considering career choices for the first time. Here, the BRIEFING and FIT canvas were filled out together in two customer workshops. The immersion into the game world was done only by the research team to create a meaningful solution.

The EXPLORE phase helped to identify the most important motivational dimensions for the pupils, namely meaning and competence. Based on this, it became clear that two misfits are the main roots for the pupils' low engagement: "the game seems meaningless" and "success is too dependent on individual skills".

Aided by the web application, a complex concept consisting of four molecules was generated. It contained a mystery that consisted of a riddle and storytelling, a collection play field, a protocol and an avatar that was connected to skill points.

With the canvases it was possible to explain the customer the procedure precisely and to let them participate at the design process without going to deep into the gamification and game design matter. It further allowed for a connectivity to other business projects by starting with a target group and context description that had to be signed off by the customer.

The design team recognized in the EXPLORE phase that a lot of misfits were applicable in the context. So, it was necessary to decide for a few of them to prevent fuzziness and overcomplexity. Having the concrete case present it became obvious that some misfits produced other misfits and other were just effects of other misfits, leading to two or three core triggering misfits that were the root of the others. Subsequently, the canvas was elaborated as such that it was possible to draw connections between misfits in terms of cause-effect-relationships to find out where the core misfits lie, and which misfits are produced by another. This gave the applicants again more clarity.

6.3. Application in workshops

The canvases were provided for participants in two advanced EMPAMOS workshops as design tools, so that they could use them for their projects.

It became obvious that especially in the first phases (BRIEFING and EXPLORE) the canvases helped to formulate concrete and unambiguous objectives for their concepts.

The CREATION canvas was used for several iterations, which is why a line was included where the number of the iteration could be indicated.

Both, in analogue and in digital settings, it proved useful to work with sticky notes in different colors. The colors can indicate, whether a hypothesis is just formulated, validated or rejected. Additionally, the different origin of game design elements ("pantry" or new) could be indicated by colors.

7. Discussion and Limitation

The aim of this paper is to design a framework for the development of meaningful and tailored gameful design concepts for non-game contexts. A DSR field-based research process was used to design the artefact and to identify the best fitting process steps. The designed framework is the first to consider game design misfits and already existing game design elements in a context ("pantry"). It includes the target group, the target behavior and the context as three main pillars and considers them in every stage of the iterative process. Through its visual clarity, the meta canvas is fostering the discussion in academia and can be applied easily by practitioners.

Gamification research benefits from the design-based development of this artefact, as it builds a bridge between design thinking, value proposition design, service innovation and game thinking. By using the canvas in further gamification projects, we will gain additional knowledge about what kind of game design misfits and elements occur in which contexts and are connected to which target group. We also learn more about the design process in gamification and how an ideation phase can be structured and well-organized between the both poles of pure randomness and AI-aided rationalization.

The social and service innovation perspectives give also a theoretical underpinning for gamification in the contexts of business and innovation. Further scientific work could elaborate, how gamification connects to recent business theories and methods, e. g. in innovation and entrepreneurship research.

With regard to practice, the EMPAMOS meta canvas is a very powerful tool to reduce complexity of gameful design for non-game contexts and increase the fit of a concept with target and context. Through the discussion with project partners and workshop participants the framework could be enhanced and tailored to the special needs of game design developer on all levels of expertise. Additionally, it could be fruitful to connect the EMAMOS canvases with the *Gamification model canvas,* e. g. in the CREATE phase, by mapping the MDA framework on the game design pattern language and classify the game design elements to create a middle-range classification. Though, a one-to-one classification will not be possible, as single game design elements might impact more than just one dimension of MDA.

However, there are also limitations that should be addressed in the future. The term "target group" on the canvas implies a one-way direction between the designer and the individual that benefits from the game design concept. To align with the service design and human-centered design perspective it might be appropriate to speak about the "user" or the "recipient" of the gameful service; even "customer" could be an appropriate term [27].

Further, the canvases present a framework for the conception phase of gamified solutions and support the encompassing development of meaningful and tailored concepts. However, following this, the developed designs have to undergo the subsequent steps that are also part of the design thinking and lean start-up process, e. g. protoyping, developing and programming, implementation, testing, piloting and exploitation or commercialization (dependent on the context). Therefore, further canvases, e. g. IMPLEMENT and TEST / EVALUATE are considered as the next steps of the design-based research. This does not mean that canvases combined with the pattern language only lead to theoretical, abstract concepts. Already in the EXPLORE phase the game design elements are connected with the non-game world. In the CREATE phase every game design element has to be transferred in the specific context with at least a rough idea for the implementation. That is why the boundary conditions of the context (for example, the use of a specific software) are listed in the BRIEFING. Hence, the pattern language provides also a foundation for the implementation. In further research the different ways of implementation are collected and connected to the game design elements, leading to a list of possibilities, how a game design element could be used in practice.

8. Acknowledgements

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10. Appendix
10.1. Game design patterns

Table 1
Game design elements

#	Name of the element
1	Arrive
2	Badge
3	Reward
4	Constrained Communication
5	Event
6	Remember
7	Feedback
8	Question
9	Common Playing Field
10	Information Asymmetry
11	Competition
12	Cooperation
13	Resources
14	Roles
15	Collecting
16	Victory Condition
17	Victory Points
18	Player Progress Indicator
19	Storytelling
20	Penalty
21	Swap
22	Team
23	Loss Condition
24	Time Limit
25	Chance

Table 2
Game design misfits

#	Name of the misfits
1	Own performance not assessable
2	Decision uncertainty too great
3	Rules are too complicated
4	Game does not encourage cooperation
5	Game is too easy
6	Game is too hard
7	Game seems meaningless
8	Game duration too long
9	Success depends too much on skills
10	Game situation is unclear
11	Gameplay is too predictable
12	Competition is too strong

10.2. Meta canvas

Figure 6: Meta canvas: recommended path (dashed line) and horizontal thirds (dotted)