MEANINGFUL GAMIFICATION THROUGH METAPHOR GENERATION

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Abstract In this paper, a method for meaningful gamification will be introduced. Gamification gives a source objective that encourages people to fulfil a task they are reluctant to and makes people achieve the target. For this, meaningfulness is necessary. While gamifying an experience, external rewards would not replace the transversal objective. Thus, a method for "meaningful gamification" is proposed. According to Nicholson's (2012, 2015) theoretical framework for meaningful gamification, users who have linked an activity to their personal objectives are more likely to have enhanced internal desire to pursue that activity. Based on this theoretical framework, this study aims to clarify creating comprehensible and aesthetic metaphors for meaningful gamification. Therefore, this method focuses on the meanings that emerged from experiences to be mapped from the target objective from the source objective. For generating meanings, metaphor generation is one of the most adopted approaches by designers. The physical, functional or experiential qualities of a source are mapped onto a target to create a familiar sense in metaphor generation. This method is based on the patterns for the processes of metaphor generation and **associates this process to the domain of gamification.**

Introduction: Meaningful Gamification

Gamification applies game design elements to other domains of life to improve user experience and user engagement. The study of game design and elements in different contexts is a topic in human-computer interaction based on dialogues between HCI and video games such as design features for enjoyment, motivational psychology, affordances and persuasion (Deterding et al., 2011a). Gamification has been defined as a process of enhancing services with motivational affordances and behavioural outcomes by invoking gameful experiences (Huotari and Hamari, 2012; Hamari, 2013). It refers to using design elements characteristic for games in non-game contexts (Deterding et al., 2011b).

"Meaningfulness" is an essential issue for gamification studies, and meaning is a crucial aspect of engaging gamification (Deterding, 2011c; McGonigal, 2011). When an activity is interwoven inside a narrative, supports users' own aims and interests, or has a purpose that is regarded important by users, it is framed as meaningful (Deterding, 2011c). People desire to belong to and contribute to something that has enduring value beyond our own lives, therefore meaning is an essential incentive (McGonigal, 2011).

Creating an environment where participants may explore and discover meaning is at the heart of the notion of "meaningful gamification." It is a "free and safe area that allows individuals to explore their potentials and eventually devote themselves to study, develop, and grow" (Kolb and Kolb, 2010).

For both physical and virtual spaces, the goal is similar: to create a set of playable mechanisms that assist the participant in finding what is fascinating and meaningful about the underlying non-game context and connect it to their existing experiences, knowledge, and skills. Each participant can take away different things from the gamification experience because they discover what is valuable (Nicholson, 2012).

In order to develop strategies for meaningful gamification, Nicholson (2015) explored six elements of game design:

- "Play: Facilitating the freedom to explore and fail within boundaries.
- Exposition: Creating stories for participants that are integrated with the real-world setting and allowing them to create their own.
- Choice: Developing systems that put the power in the hands of the participants.
- Information: Using game design and game display concepts to allow participants to learn more about the real-world context.
- Engagement: Encouraging participants to discover and learn from others interested in the real-world setting.
- Reflection: Assisting participants in finding other interests and past experiences that can deepen engagement and learning" (Nicholson, 2015, pp. 5).

—NO! YOU CAN'T GIVE YOUR LECTURE LIKE THIS...YOU TOTALLY MISUNDERSTOOD GAMIFICATION.

Although external rewards might be helpful, numerous examples show how incentives can detract from performance. People have grown accustomed to receiving prizes such as grades, gold stars, and money to motivate them, and incentives and punishments are two sides of the same coin. While prizes are practical motivators, it is assisting someone in making their own decisions about their behaviours without the need for an external controlling behaviour that produces superior results (Kohn, 1999).

Virtual prizes, points, scores, badges, and leaderboards are examples of game design components that visualize the task's metric and are a huge concern with gamification. However, putting too much emphasis on these features misses the reality that they are feedback mechanisms, not game mechanics, and that they are the most basic kind of gamification, leading to pointless applications (Marczewski, 2014).

To assist participants find meaning in the underlying task is a powerful aim of meaningful gamification. External rewards should be substituted with engaging play. Since the intended context of gamification is not a gaming platform, the long-term goal of gamification should be a meaningful game-based experience that is well-connected to the underlying non-game environment. In a non-game activity that is relevant to the user, meaningful gamification aims to provide psychological and behavioral consequences (Nicholson, 2012).

Persuasive Aspects of Gamification

Persuasive aspects of gamification are not limited to making activity measures visible. While these are goal-oriented features of the activity, there are other sensations that are not related to objectives. These are experiences that are just not goal-oriented and give people with meaningful encounters (Jensen, 2013). Rather of employing a point system, effective gamification strategies evaluate components of the underlying activity to determine where game elements might be included (Nicholson, 2012).

The self-determination theory is a macro explanation of human motivation and their intrinsic psychological needs developed (Deci and Ryan, 2000). Intrinsically driven activities are those that a person finds fascinating and engages in without any training or conditioning, simply for the joy of doing so. To maintain intrinsic motivation in individuals, it is vital to meet their psychological and social requirements of autonomy, mastery, and relatedness (Aparicio et al., 2012).

Autonomy. When doing a task, autonomy implies a sense of will, and perceived autonomy is substantial when actions are undertaken out of personal interest. Allowing people to make their own decisions without supervising or managing them and avoiding any form of reward for external causation have all been found to increase autonomy and, as a result, intrinsic motivation.

Competence. Competence refers to people's desire to participate in difficulties while also feeling competent and efficient. They are adjusting the objectives of the activities to each user's capabilities by providing optimal challenges that promote the perception of competence and positive feedback, but not at the expense of the perception of autonomy because otherwise, the user will not feel responsible for the actions that have led to this favourable situation.

Relatedness. Another psychological requirement linked to intrinsic motivation is relatedness. We need to make it easier for people to communicate with one another and strengthen interpersonal relationships. We also need to include gaming mechanisms that allow users to express themselves while influencing others (Aparicio et al., 2012).

An experimental study by Chandler and Kapelner (2010) aimed at integrating meaning into a task for assessing how gamification in a meaningful frame would be linked to behavioural and motivational outcomes. For this purpose, they explained to the participants that they would identify tumour cells in an image tagging task. Compared to participants who were instructed to identify "mere items of interest," their experiment resulted in more photographs being labelled and a higher chance of participating in the task. Participants in a similar study by Rogstadius et al. (2011) were told that their efforts would benefit a non-profit organization, resulting in higher-quality work. They were, however, littler in number.

As the example above indicates, using external rewards would not replace the transversal objective and pyschologies and social needs such as autonomy, mastery or relatedness. For this, the gamification mechanisms should be decided carefully. The users should intrinsically be guided to achieve the actual task while feeling engaged throughout, fulfilling and satisfied at the end of the process. Therefore, this study proposes a method for meaningful gamification based on metaphor generation.

Product Metaphors

Metaphors help people grasp a new situation by relating it to a familiar experience (Ortony, 1991). Using metaphors to refer to what is already understood to explain the unknown is possible. Metaphors, in essence, are indeed a unique juxtaposition of the familiar and the unfamiliar. They are seen as valuable tools in problem-solving, and they cause the formation of novel connections, which expands the human capacity for interpretation (Lakoff, 1987, 1993). Three key phases are relevant to the use of metaphors in problem-solving (Gentner, Bowdle, Wolff, and Boronat, 2001):

- The first phase is pulling a wide range of foreign notions from the far fields, where potential connections to the topic at hand are often not obvious.
- The second phase is creating a map of the metaphorical concept's deep or high-level links with the situation. Abstractions and generalizations are used to identify correspondences.
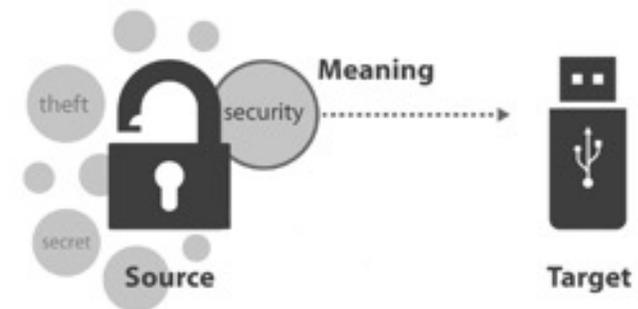

Figure 1. An example of a product metaphor ("Datenschutz" by dialog05, URL-1);
Figure 2. The relationship of the terms used in Cila et al. (2014)

- The last phase transfers and applies structural correspondences from the metaphorical source to the problem at hand, which usually results in a creative solution (Casakin, 2007).
- Cila et al. (2014) proposed a framework for product metaphor creation, which aimed to connect linguistic theories on metaphors to the product design domain and clarify how designers generate meaningful and aesthetic metaphors. According to this framework, designers decide on;
- The meaning they wish to convey,
- The source that can convey this meaning,
- Which attributes of this source they will project onto the target,
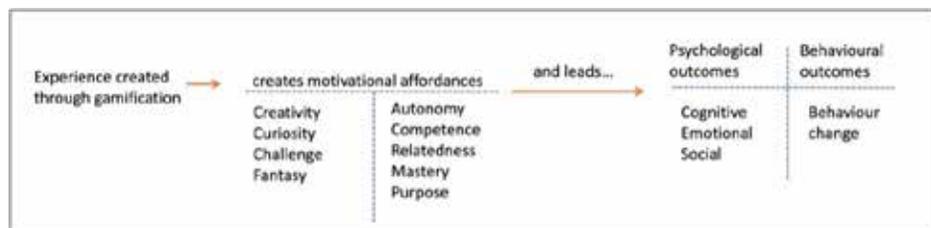- and how they will execute the mapping." (pp. 25).

Figure 3. Gamification creates motivational affordanc
(adapted from Deterding et al., 2011b; Aparicio et al., 2012).

The designer utilizes a metaphor in a product to modify our traditional way of perceiving things through the metaphor generating process. Product metaphors have a source domain where specific features are appropriated and a target domain where these features are transmitted, similar to verbal metaphors. As a result, the source and the destination share some visually or conceptually relevant mappable elements (Cila and Hekkert, 2009).

Designers create metaphors by transferring one or more attributes from one item to a product they're working on. For example, the designer infers a link between a memory stick and a padlock in the product metaphor (Fig. 1). Rather than creating software into which users may input their passwords, the designer has users use a physical key to unlock the shackle and get access to the data (Cila and Hekkert, 2009). The memory stick is a product that has been given a new meaning and is therefore referred to be the metaphor's target, while the padlock is referred to as the source, the entity that alters the
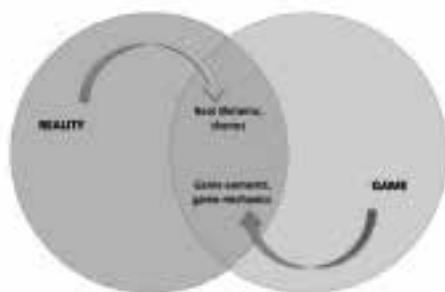

Figure 4. Dynamics of gamification: A two-way relationship
between the game and non-game contexts

target to impart that meaning. The significance in question is the USB's "data security," which the designer has underlined by transforming the device into a padlock (Fig. 2). Projecting qualities of the source onto suitable properties of the target, known as mapping, physically create metaphorical relationships between the target and the source (Cila et al., 2014).

Gamification as Metaphor Generation
In non-game contexts in which game elements are situated, we encounter a new kind of experience called gameful experience. These experiences involve transfers of meaning from the original context, a game context, to a non-game context in which the tasks need to be more engaging.

Reality and game meet at a point where they are intertwined, resulting in a new form of experience. Motivational affordance is formed at the intersection of game and reality, and it satisfies motivational demands such as autonomy, competence, and relatedness, as outlined by self-determination theory in psychology (Deci and Ryan, 2000). When these
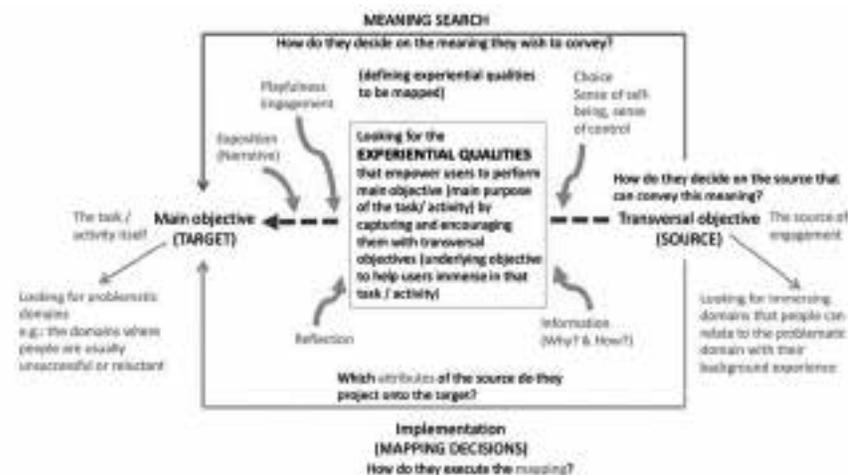

Figure 5. How designers employ gamification in their designs

requirements are addressed, imagination and motivation are sparked, leading to positive psychological and behavioural outcomes (Fig. 3).

The gamification dynamics in which reality and game interact in a two-way manner, with reality borrowing game aspects and mechanisms from the game. The game, on the other hand, uses real-life goods and themes. There is a two-way trade from different worlds, from reality to game domain and vice-versa. These two domains lend meaning to each other and contribute a whole experience. Designers have to generate meanings that make sense of this relationship and bridge the two worlds. Communication between two domains is established by creating semantic bridges. Designers rely on several meaning generation methods. Metaphor generation is one of them which underlies those meanings for meaningful gamification strategies. These semantic bridges are usually built through metaphors. Metaphors are intermediaries that carry one meaning to another domain. The study will present a method of generating metaphors for meaningful gamification. Its validity for meaningful gamification was investigated by applying it to the

various gamification metaphor samples (Fig. 4).

Aparicio et al. (2012) proposed a primary sequence of activities for the gamification process. The most significant steps of the gamification process involve:

- Identification of the main objective: identifying the main objective of the task to be gamified
- Identification of the transversal objective: specifying underlying objectives that are interesting for people
- Selection of game elements for supporting human motivation needs: Selecting game mechanics that match these objectives; supporting the needs of human motivation such as autonomy, competence, and relation.
- Evaluating the effectiveness of the implementation of gamification is based on fun,

satisfaction and service quality

These steps in a gamification process involve similar decision-making steps of the metaphor generation process. Designers generate metaphors by identifying main, transversal objectives and game elements, deciding on the source, target, meaning and mapping. Therefore metaphor generation forms a remarkable framework for constituting means adapted to meaningful gamification (Fig. 5).

Examples from conceptual and commercial products samples are analyzed to clarify how to create understandable and aesthetic metaphors for meaningful gamification. This analysis is enhanced with other product examples, aiming to persuade or engage people to perform complicated tasks by providing them with more engaging tasks. This explora-

Figure 6a. iFloor Project, 2004 (Krogh et al., 2004);
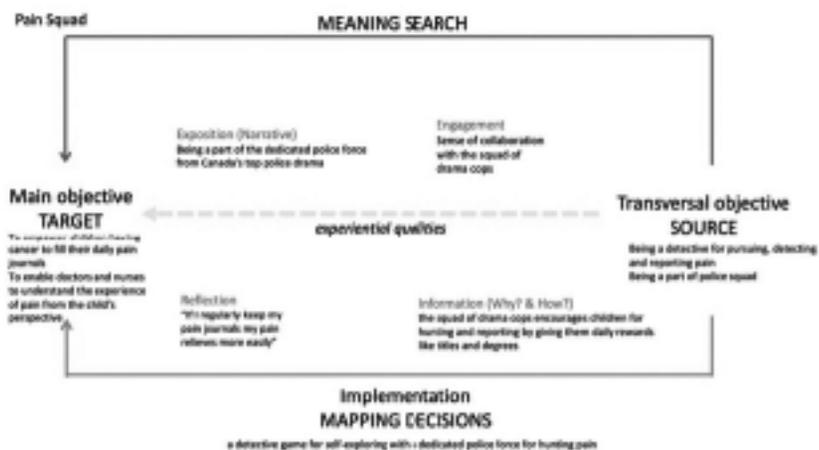Figure 6b. Analysis of metaphor generation in the example

Figure 7a. Odenplan subway, 2009
Source: https://www.designoftheworld.com/piano-stairs/;
Figure 7b. Analysis of metaphor generation in the example

tion is based on the gamification process proposed by Aparicio et al. (2012) and refers to the concept of meaningful gamification proposed by Nicholson (2012, 2015). The aim is to identify the significant patterns on how designers employed gamification and to offer a methodological framework for generating meaningful experiences through gamification. To check the validity of the proposed method for meaningful, several samples in which designers used gamification as a design strategy were identified and mapped as metaphor generation. The following four studies illustrate the steps of the method for meaningful gamification through metaphor generation.

Meaningful Gamification: Metaphor Generation Samples
As Jensen (2013) and Nicholson (2012) claim, the given applications of gamification are meaningful for people in the exemplified contexts.

Jensen (2013) describes the iFloor Project, which began in 2004 at the city library in Aar-

hus, Denmark, as a design research project to enhance the library experience. Visitors might transmit their questions to a system via their mobile phones on an interactive floor in the lobby. The user must initiate a discussion with a stranger for the system to project their query on the floor through a projector. The camera watching the users notices that a dialogue has begun and shows the user's query. The initiative's goal was to reintroduce social contact into libraries by encouraging serendipitious encounters with strangers (Fig. 6).
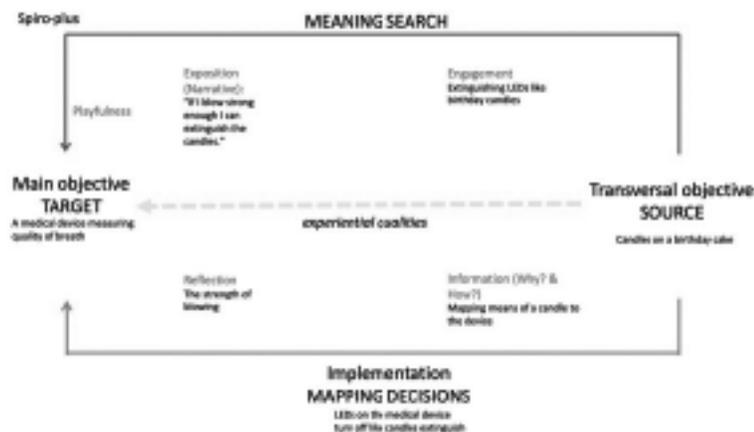

Figure 9a. Spiro-plus, 2013, Source: https://www.berkilhan.com/spiroplus
Figure 9b. Analysis of metaphor generation in the example

In Sweden's Odenplan Subway, a piano keyboard was installed on the stairwells leading into the subway, encouraging passengers to use the stairs rather than the escalator (Nicholson, 2012). They installed a piano keyboard on the subway steps in the hopes of encouraging more people to utilize the stairs rather than the escalator (Fig. 7, Volkswagen, thefuntheory, 2009).

There are different examples from different domains, such as medical designs. The following examples support the treatment processes of people experiencing difficult health issues.

Figure 8a. Pain Squad, 2012, Source: http://www.cundari.com/cases/pain-squad/; Figure 8b. Analysis of metaphor generation in the example

"Pain Squad" application is directed towards special user groups. This application is designed by a Canada based agency- Cunduri Inc.; to encourage young cancer patients to complete daily reports on their pain with support from Canada's top police dramas by gamifying cancer treatment for sick kids and to give doctors the tools they need to understand the experience of pain from a child's perspective. This application offers these kids a detective game for self-exploring with a dedicated police force for pursuing, detecting and reporting pain. They explore the pain on their body like a detective and reports them to the squad of drama cops who encourages children for reporting by giving them daily rewards like titles and degrees (Fig. 8, Cundary Inc., 2012).

Another example is a medical device, namely "Spiro-drive", designed by Berk İlhan, a pulmonary function testing device that provides patients with interactive feedback. By using "candle" metaphor, Spiro-Plus aims to motivate patients and reduce stress factor in order to increase test efficiency in hospitals. It aims to persuade patients by making the measures visible in an enjoyable way. This medical device is used to detect chest disease by making the patients blow to extinguish the LED candles on the device to obtain effective measures (Fig. 9, URL-2).

These examples show how game features may provide game-like qualities in non-game environments, allowing users to fully immerse themselves in the activity. Another conclusion that can be drawn from these instances is that designers have used metaphor creation as a design technique extensively. For example, meeting with strangers in a library to find out the answer to your questions, stair climbing as if it were a piano, self-exploration as if you were a detective, and blowing to a device that counts breath quality as if they were birthday cake candles, involved scenarios from source domains with a familiar and engaging story are mapped to the target domains.

Conclusion

The relevance of game use and integration necessitates a significant degree of creative decision-making on how to tie game aspects to non-game contexts in a "meaningful" way by emphasizing people's real-life experiences. To better comprehend relevant features of meaningful gamification, it is necessary to approach the word methodically in a design process. It is also important to grasp the tactics used by professional designers that use gamification as a design strategy . This paper proposes a method for meaningful gamification by exploring the significant patterns in designers' strategies. Examples that persuade people to perform main objectives through transversal objectives are selected for discussion. Meaningful gamification examples illustrate that metaphor generation as a design strategy has been employed by designers, as in the samples iFloor, Piano Stairs, Pain Squad and Spiro-plus. These examples provided a significant pattern for a methodological framework for meaningful gamification. However, this method needs to be validated through further explorative studies.

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_ MAIN IDEA OF PAIN SQUAD _