Using Game Principles in UX Research: A Board Game for Eliciting Future User Needs

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ABSTRACT
This paper presents a board game approach as a UX research technique to assess potential user experiences regarding a future product. It discusses how the use of a board game may provide a) a safe research environment in which participants feel comfortable to share their thoughts and experiences in a group setting, and b) a tool to facilitate users to think about their needs regarding a future product. The use of the board game approach is illustrated by a case study in the context of developing a new train information system. The design of the board game that was used is described in detail, as well as how the game was used to elicit potential future experiences. A survey amongst the participants showed that the board game was appreciated as a surprising, pleasant and 'safe' research method.

Author Keywords
UX techniques; Board game; Future user needs; Gamification

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
Game elements are increasingly used in non-gaming contexts [2] to improve user experience (UX) or user engagement [3]. This idea, also referred to as gamification, has mostly been used in the design of new applications that aim to stimulate learning or behavior change. Building on this trend, game principles might also be used as a technique in UX research as games are considered to provide a safe environment to fail and to make mistakes [4]. Also, social influences may hinder creativity when working in groups [9], which may be mitigated by using a game. Board games seem especially interesting in this respect, as people have been familiar with this genre of games since childhood. The casual elements of a board game may act as an icebreaker, making it easier to speak one's mind.

This paper presents a game-based approach that was used to learn about possible user experiences regarding the use of a future product. Whereas more common UX research techniques, such as interviews or observations, focus on people's current and past experiences, such techniques are considered less suitable to understand potential future experiences [8]. In this respect, games were thought to provide an interesting research approach. Games usually offer a narrative [6], which could be used to provide a fictitious (but familiar) setting allowing to add futuristic elements (e.g. products or services that do not exist yet) to provide a glimpse at possible future experiences. Moreover, a board game creates a more relaxed atmosphere for exploring future scenarios, setting participants at ease, taking away some of the uneasiness they may experience when using enactment methods like role-playing.

Although examples of using game principles as a research technique have been reported (e.g. Huyghe et al. based a workshop method on the Game of the Goose, Bernhaupt et al. [1] used card games to make cultural probes more playful, and Kultima et al. [5] developed games as a tool for idea generation), overall, little literature is available providing hands-on experiences and suggestions. Where the examples mentioned above focus on idea generation and cultural probes, this paper presents a game-based research approach to bring participants into a specific setting to explore their experiences and needs regarding a future product. We illustrate the potential usefulness of this approach with an initial case study (focusing on a future 'omniscient' train information system). We discuss how we used game principles, and we illustrate what type of results one might expect when using a board game to learn about future experiences. This paper provides a game-based angle to eliciting potential future user needs and contributes to the literature on using games as a research technique by sharing

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our game-based research approach and by inspiring other researchers to make their research more playful.

CASE STUDY: A FUTURE TRAIN INFO SYSTEM

The present case study was part of an ongoing, two-year research project aiming to develop a personalized, context-aware, multi-source train information system (TIS). More specifically, multiple sources of information (travel information as well as indirectly relevant information, such as weather, waiting times at coffee bars, or crowds in the station) are integrated into a single framework filtering the information by means of a dynamic traveller profile based on travel goals, comfort preferences, actual behavior, etc.

In the first phase of this project, qualitative user research (observations and stimulated recall interviews) was carried out to gather information on travellers' current train travel experience, and their information needs before, during and after travel. In addition to understanding current needs, we wanted to understand travellers' needs regarding our future TIS concept. We were especially interested in questions that are on train travellers' minds that are not answered by currently available information. For this purpose, we invited experienced train travellers to play a board game.

The board game was designed to represent a fictitious door-to-door train trip. The starting point was home, from which the players had to get to the train station, catch a train, connect to another train, get off the train, and reach their final destination. During the game, players could ask questions to a futuristic, omniscient TIS via a chat program on a tablet. One of the researchers would answer the questions remotely, Wizard of Oz style (players were not informed about the human nature of the TIS beforehand).

The board game workshops

The board game was first tested in a pilot session. Four of our colleagues (also frequent train travellers) played the game for half an hour. Based on their experiences, we made several small changes to the game (see below).

After the pilot, two workshops were organized with 30 participants (17 men, 13 women) recruited via a living lab research panel that is representative of the Flemish population. People who travel by train (at least occasionally) and who were interested in sharing their thoughts and expectations about future train information services were invited to participate. During the workshops, the game was played simultaneously at two or three separate tables, each moderated by a researcher who explained the rules of the game and the use of the TIS. The games lasted about 90 minutes.

Analysis

During the games, audio recordings were made, which were transcribed. Also, the questions asked to the TIS (including the answers) were logged. After the workshops, the participants were asked to fill in a short online survey. This survey included eight questions about the participants' general attitudes towards board games and their experiences during and after the workshop. The log files, as well as the transcripts were coded to identify underlying user needs. For this analysis we used the codes that emerged during the open coding of the previous user research, adding new codes when necessary. This allowed us to identify new insights that emerged from the board game study as well as to deepen our understanding of previously identified insights, and in turn to further shape the concept of the future TIS that will be developed in our project. The surveys, completed by 20 participants, were analyzed descriptively to get a feeling of the participants' experience of the board game as a research method.

The board game

Below, we describe the details of the board game (the board, the equipment and the rules). We explain the game principles we used, our approach to eliciting future experiences, and how the board game worked in practice.

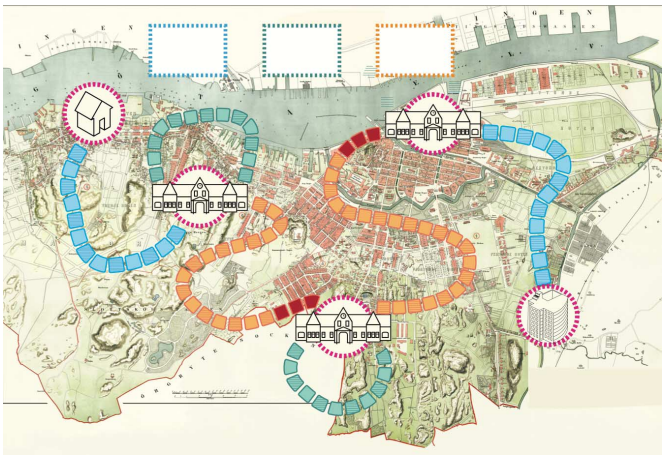

Figure 1 The board of the game used in this study.

Board game principles

The layout of the board (Figure 1) was loosely based on The Game of Life, simulating a journey by means of a **track on a board**. Our board game's track represented a train trip from home to a non-specified destination. Common phases of the journey were visualized (home to station, at the station, in the train, station to destination) to understand the questions travellers would ask the TIS in each phase. To move along the track, players threw **two dices** to determine how many squares they were allowed to move their playing piece, adding some randomness to the game.

The board track consisted of **three types of squares**: event squares, blank squares, and penalty squares. Landing on an event square meant that the players had to draw an event card (see below). A blank square allowed players to ask an open question to the TIS. Conform The Game of the Goose, players landing on a penalty square lost a turn (cf. a delay or missed connection). The different squares were aimed to add some variation to the game, giving the players a sense

of unpredictable surprise in each turn, to make the game more engaging (several participants' remarks in the survey illustrate this, e.g.: *"you don't fully control the course of the game - exiting, makes you absorb in the game"* (pl.09)).

Event cards (cf. the Chance and Community Chest cards in Monopoly) were used to represent common and realistic events that might happen during each phase of a train trip (rain, overly crowded trains, unexpected delays, etc.). These cards were based on data collected in a previous series of ideation workshops where participants (as an icebreaker) had to write down several frustrating things that happened to them during recent train trips. The cards were intended to provide the players with real-life events that could serve as a specific context for asking questions to the TIS (see below). During the pilot session however, we noticed that the events steered the questions too much. We realized that we would only gain insights regarding information needs related to the specific events we included in the game. This was partially solved by creating the possibility for asking open questions when landing on a blank square. However, the use of these open questions seemed to be quite difficult for participants at times (e.g. *"Sometimes it wasn't easy to think of open questions."* (pl.09)), illustrating that thinking about possible future situations remains a difficult task.

Each **turn** consisted of several steps. First, players threw the dices and moved their playing piece accordingly. In case they landed on an event square, they drew an event card and were allowed to ask a question to the TIS based on the event described on the card. Landing on a blank square allowed players to ask an open question. When players decided to ask a question, they were allowed to throw the dice once more. At the end of each turn, all players at the table discussed the question and the train system's answer (Was it helpful? What kind of answer had they expected?).

Finally, several game principles were applied to facilitate the feeling of **competition** between players. For instance, the game had a clear goal that was representative for the journey the game aimed to enact: reaching a destination as quickly and comfortably as possible. The first team to reach the destination would win. Furthermore, the penalty squares resulted in disadvantages regarding the other players. These elements of competition intended to contribute to a playful experience, and in turn to the group atmosphere (which was appreciated by several participants, e.g.: *"A little bit of competition resulted in a good group atmosphere"* (pl.02)).

Eliciting future user experiences & needs

Players **used a mock-up of a future product**: they were allowed to ask any question they wanted to an omniscient train information system via a tablet. The answers of this system went beyond information that train travellers would currently be able to find (e.g. by linking data sources, or by providing highly personalized information), for example: "The queues at the ticket office are rather long, it'll be faster to buy a ticket at one of the machines as there are hardly any people there.". Answers such as these aimed to surprise the players and stimulate them to think more creatively about questions to ask in later turns.

Teams of two players competed against each other in each game. By working in pairs, we aimed to facilitate discussion and the generation of questions [7]. The game moderator would involve all players in the discussions by asking if the other players would have asked a similar question. Together with the couples' initial discussions, this helped us to gain insights into the needs underlying the questions. Several players indicated to appreciate this atmosphere (e.g. *"Everybody got the chance to react, not only the person whose turn it was."* (pl.14); *"Everybody got plenty opportunity to contribute."* pl.07)).

To represent several types of train travellers, and to take players out of their own standard expectations of a train trip, we introduced **fictional characters**. Players were given a specific character representing, for instance, a train commuter, an occasional train traveller, or a group of travellers. They were stimulated to assume the role of their character and to think about what their character would want to ask the TIS. During the workshops, however, we concluded that the characters did not work as well as we had anticipated. The moderators repeatedly had to remind players to use their characters, and several participants mentioned in the survey that they did not empathize with their characters (e.g: *"I had to play this character and I managed, but in reality I don't really scare so easily and so I did not say the things I would have said if I were to be myself."* (pl.13) and *"The role of a rich business man did not suit me…"* (pl.17)).

RESULTS & DISCUSSION

A game as a safe research environment

Based on our own experience as well as on the survey results, we feel that using a board game did indeed create a safe environment in our case study, making it easy to share experiences. Most participants indicated that they felt at ease while playing the game (mean score on this item in the survey (on a scale of 1 – 10) was 7.95, SD = 1.54) and that they could say what they wanted to say (mean score = 7.65, SD = 2.13). Some participants mentioned that the game facilitated discussion and sharing (*"It made it easier to talk to the other people."* (pl.03), *"Nice game which made it easier to formulate an opinion."* (pl.19)). Others indicated that they experienced the game as very pleasant (*"A pleasant and casual way of brainstorming."* (pl.04), *"A nice and playful way to share experiences"* (pl.02)).

Seventeen of the 20 participants who filled in the survey indicated that they like to play board games in general. Also, most participants indicated that they were pleasantly surprised when they first learned they were about the play a game (*"Nice, original, it definitely won't be boring like this."* (pl.07), *"This seems like a fun way to think about the topic to me."* (pl.14)). However, not everyone likes games. Three participants were disappointed when they heard they were to

play a game (*"The term 'childish' went through my head."* (pl.11), *"Oh no. Monopoly déjà vu."* (pl.17)).

A game to elicit future experiences

By using a board game in our case study, we gained new insights that had not surfaced in our previous user research (using 'traditional' observations and interviews). First, the board game allowed us to focus more explicitly on what is on train travellers' minds during each phase of a train trip. The stimulated recall interviews already yielded some understanding of this, albeit a rather limited understanding as it was based on participants' recollections of one specific trip. Some questions, concerns, etc. are on train travellers' minds all the time and may become so common that they are not consciously aware of them anymore. This more implicit aspect of user experience (also referred to as tacit or latent knowledge) is difficult to assess with traditional UX research methods and requires a more generative approach [8]. We feel that the board game helped us to understand latent information needs because the setup stimulated participants to discuss many of the questions on their mind (which they could ask the TIS).

In addition, several of the needs that surfaced during the analysis of the board game study results were specifically related to the future TIS under development (and mocked-up in the board game set-up). Such 'new' needs, that were not identified in our previous research, were mainly related to one of the following categories: information regarding the train or carriage one is in (e.g. occupation rate, noise levels, storage room), facilities and services in and around the station (lockers, shops), connections to other means of transportation (e.g. availability of taxis or rental bikes), communication with train personnel, personalized travel suggestions (adapted to personal agendas or preferences, translation of announcements), and continuous, real-time information about delays and connections.

Finally, some event-related topics were repeatedly discussed during both board game workshops, but had not come up during either the interviews or the observations. One example of such a topic is the feeling of safety during a train trip. Several players asked our TIS to direct them to a safer place, or to contact railway or security personnel for them. This was obviously related to one of the event cards, but nevertheless represented an underlying need to feel safe. The topic of safety had not emerged during the observations or interviews, due to the fact that unsafe situations had not occurred. This can also be a problem when using event-based methods such as stimulated recall or the Critical Incident Technique: as long as an infrequent event does not occur, it will not be identified as important. Using a board game was a good approach in our study to yield user needs related to important, but infrequent events. However, one can only yield insights regarding the elements included in the game design. It is impossible to incorporate all events that may possibly be relevant.

CONCLUSION

In sum, the board game study described in this paper was well received by the research participants. It seemed to create a surprising and safe environment to share their thoughts and experiences in a group setting. In addition, we feel that using a board game helped us to bring research participants into a 'future state of mind', and in turn to understand latent needs that are difficult to assess with more traditional UX research methods. In this paper we carefully described how we designed and used a board game, thereby providing other researchers with inspiration and suggestions for using similar approaches in their research. As this paper describes an initial case study, further research is necessary to validate this approach.

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