# Hybrid Board Game Design Guidelines

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## ABSTRACT
Hybrid board games combine non-digital and digital elements to introduce a new kind of game experiences. In this study, we present 17 design guidelines for hybrid board games. These guidelines are the result of an iterative process of workshopping with industry experts and academic researchers, supported by developer interviews and player survey. They are presented as starting points for hybrid board game design and aim to help the designers to avoid common pitfalls and evaluate different trade-offs.

## Keywords
Board games, phygital, hybrid, augmentation, design, guidelines, virtual reality, augmented reality, mixed reality

## INTRODUCTION
The popularity of board games has surged during the last decade. The global board game market value was over 3 billion dollars in 2016 (Statista, 2017), and is expected to rise over 12 billion by 2023 (Research and Markets, 2018). While traditional board games like Monopoly (Magie, 1933), Scrabble (Butts, 1948) and Settlers of Catan (Teuben, 1995) are holding their ground, the popularity of games that combine analog and digital elements to enrich the game experience is on the rise. These hybrid board games (HBG) can utilize digital technologies such as virtual and augmented reality, near-field communication protocols, Bluetooth and wireless networks, smartphone cameras or scannable QR codes. Even the classic board games like the ones above have versions that utilize some forms of hybridity. For example, Monopoly Electronic Banking (Hasbro, 2007) follows the rules of the traditional game, but has an electronic device that acts as a credit card reader. The device allows transferring funds directly between players instead of using paper money. Moreover, McDonalds has published a version of Monopoly that uses augmented reality to provide players with additional marketing content (McCrum, 2009).

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Combining electronic or digital technology to board games is not a new phenomenon (see Kankainen & Tyni, 2014). However, the current advances in technology are opening new opportunities for combining physical and digital elements in playful products (Tyni et al. 2016), something that has also been noted in the field of game studies (cf. Toups et al. 2017). New HBGs are published steadily, and it seems they are not just a passing trend. As such, there is a growing need in understanding this brand of products, and for design information on practices and principles for designing hybrid products and services in general (see Coulton et al. 2014). Based on the research done in the two-year applied-science research project, we present 17 design guidelines for hybrid board games. The guidelines are based on a series of analysis and design workshops with industry experts and academic researchers, expert interviews, game analyses, and a player survey.

## HYBRID PLAY

Hybridity is commonly seen in the research literature as combining new technological affordances to previous forms of activities like augmenting board games with electronic or digital components (Mora et al. 2016). Early examples include Mel Allen's Baseball Game (RCA Victor, 1959) that utilizes a vinyl record with multiple audio grooves for gameplay[1] narrative while the backside of the record cover is used as a game board. The submarine game Code Name: Sector (Doyle, 1977) was possibly the first board game to utilize the power of microchip, while more recent example is Pokémon GO (Niantic 2016) that merges real and virtual environment for play purposes. Hybrid games come in many different forms, based on various platforms, and utilize technology in versatile ways.

Hybridity has been discussed in the research literature under several different terms, like augmented tabletop games (Kosa & Spronck 2018), augmented reality games (Liarokapis et al. 2009), and pervasive games (Hinske et al. 2007). These terms draw attention to different aspects of hybridity and are concerned with slightly different issues. The focus is typically on specific technological solutions to designing types of games, which makes comparisons between the approaches difficult. We prefer the term hybrid over augmentation, which as a term suggests, that the material experience is somehow inferior to the digital one needing augmentation. Rather, the tangibility of hybrid games changes the qualitative nature of them when compared to traditional forms.

A common feature in hybrid products is the combination of analog and digital experience. However, if we consider hybridity from a user experience perspective, these elements can be separate, but interlinked in certain parts, thus forming a hybrid experience. In line with this, Tyni et al. (2013) present a model of hybrid dimensions where hybrid experiences can be presented with two axes: independent-dependent and synchronous-asynchronous. This means that the analog and digital elements can take turns and be used independent of each other, with varying levels of dependency and synchronicity. Jayemanne et al. (2016) argue that the model is limited to clearly defined commercial products and propose that hybrid play should be understood as an "aesthetic of recruitment", where predefined and distinct entities enter into hybrid situations.

Hybridity is also not tied only to the technology. Instead, it should be considered in the larger context of the modern media environment (see Heljakka 2016), where content and approaches are used across different media. We can identify at least five types of hybridity in playful products: Conceptual, Technological, Artefactual, Thematic, and Functional hybridity (Heljakka 2012). In addition to mixing analog and digital experiences, many hybrid products also blend thematic content, or the way

products are used. For example, Beasts of Balance (Buckenham & Fleetwood, 2016) has both analog and digital elements - a form of technological hybridity. The building blocks used in the game also resemble animal figurines, which brings in conceptual hybridity blurring the line between toy and a game, while by mixing a tower building game mechanic to the use of a digital application the game also exemplifies functional hybridity. Although the technological hybridity is rarely present only in itself, it is the often their defining feature and important one as such.

Kankainen et al. (2019) argue, that hybridity should be understood as blending of different cognitive domains that are not usually associated together. Hybridization creates new kind of aesthetics that did not exist before, something that is more than a mechanical sum of the original elements (Manovich 2007). In a sense, everything is hybrid and understanding inherent hybridity in various types of games can help the designer to build a new kind of hybrid products. Indeed - for the user the overall experience matters often more than technological features.

In this paper, we address hybrid board games that utilize both analog and digital elements for creating game experiences that would not be possible without the combination of the two. The key aspect is that the both elements are designed to work together, rather than being isolated from each other.

## RELATED WORK

Regardless of the media, it can be argued, that the underlying goals of game design are the same - to design for meaningful play[2] (Salen & Zimmerman 2003). Followingly, many principles of game design are applicable to both board game and video game design, and for example, the Mechanics, Dynamics, Aesthetics (MDA) model (Hunicke et al. 2004) is a good starting point in board game design as well, as all three elements above are perceivable in both digital and non-digital games. Further, board game design is addressed in several game design books, such as Game Design Workshop (Fullerton 2004; 2008; 2014), as well as in design literature dedicated specifically to board games like Kobold Guide to Board Game Design (Selinker 2011).

However, the platform does affect what is considered as meaningful play. For example, in board games sociability has a different role and dynamics than in video games. Several research papers address design issues considering social elements in hybrid games. Rogerson et al. (2018) have studied competition and cooperation in board games. Cooperation helps players to focus on the game, and cooperation happens also between players and tangible game pieces as these are used to ease cognitive tasks in board games (cf. Wallace et al. 2012). Also, much of the social interaction in board games comes from seemingly boring chores needed for upkeeping the game state (Xu et al. 2011). In general, it seems that the relevancy of tangible elements should not be overlooked when considering the social interaction in (hybrid) board games (e.g. Ip & Cooperstock 2011; Rogerson et al. 2016).

Other studies have considered design issues of hybrid board games, or games closely related to them, from various perspectives. Cheung et al. (2013) present a set of five design principles to preserve the flexibility of board games in hybrid games: Dispensability, Live Tweakability, Tangibility, Mobility, and Value. The authors argue that with these principles it is possible to preserve the socially negotiated gameplay that is in the core of the multiplayer board game experience. Further, heuristics for evaluating the user experience of advanced tabletop games played on digital screen platforms such as the Microsoft Surface (Koeffel et al. 2010), are also applicable in HBG design.

Due to the organic nature of design, it is hard to use restrictive models in design praxis. In their study, Bergström and Björk (2014) present a design space with several dimensions for computer-augmented games which offers flexible design tool for HBGs. The framework consists of a set of design features that can be used to compare various games, to identify potential avenues for new designs and to define design goals for computer-augmented games as well as positioning ones work in relation to similar projects. The dimensions of the design space are:

- Player-agreed vs. Artefact-encased game logic
- Limited vs. Rich audiovisual content
- Fluid vs. Fixed game content
- Manual vs. Automatized excise
- Low-effort vs. High-effort modification of rules
- Low-effort vs. High-effort modification of game state
- Unlimited vs. Constrained action space
- Low vs. High tangibility.

Guidelines designed for traditional non-hybrid board games are mostly relevant for HBGs as well. Heron et al. (2018) have developed accessibility heuristics for board game design. Although the topic is rarely, if ever, touched by research literature it is very important one. However, these guidelines do not take into account the digital content of hybrid board games, which requires updating them or consulting digital game heuristics (e.g. Paavilainen et al. 2018) on the same matter.

## DESIGNING THE GUIDELINES

Hybrid Social Play research project (Paavilainen et al. 2018), was a collaboration between three Finnish universities and five industry partners from the fields of lottery gaming, print and online media, analog games and toys, and digital games. The main funding partner in the project was *Tekes*, *The Finnish Funding Agency for Technology and Innovation*[3], which promotes the development of industry and services in Finland through technology, innovation and growth funding. As such, an applied-science approach was utilized, with close industry collaboration. The aim was to "identify best practices and principles for hybrid social playability and develop tools and concepts for future, social physical-digital products and services" (Hybrid Social Play 2019). Consequently, the choice of methods used in this study were influenced by this collaboration, as the aim was to produce direct value for the industry partners.

In addition to typical research methods such as developer interviews, game analyses, player survey, a series of analysis and design workshops was organized during the project. The main inspiration for the guidelines came from two workshops focusing on hybrid board games[4]. Due to the nature of the project, the workshops were aimed both, to produce scientific data for the researchers, and to provide latest findings for the industry partners, and through this exchange develop the guidelines further. This approach allowed creating a synthesis that answers to the needs of both, the academia and the industry, by combining theoretical knowledge of the researchers to industry representatives' practical understanding, or what Caldwell (2009) calls in the context of screen industry "industry theorizing".[5]

The development of the guidelines was a multi-faceted process during the two-year research period. The approach can be described as action research (Denscombe,

2010), as the goal was to work with industry representatives in order to find answers for practical issues. The process of building the guidelines was a hermeneutical one. The initial starting point was based on literature and knowledge gathered during a previous research project on hybrid play (see Tyni et al. 2013). This knowledge was presented to the industry experts, tested in the workshops and reformulated based on the discussions and industry experts' previous understanding of the topic. The full process can be seen in Figure 1.

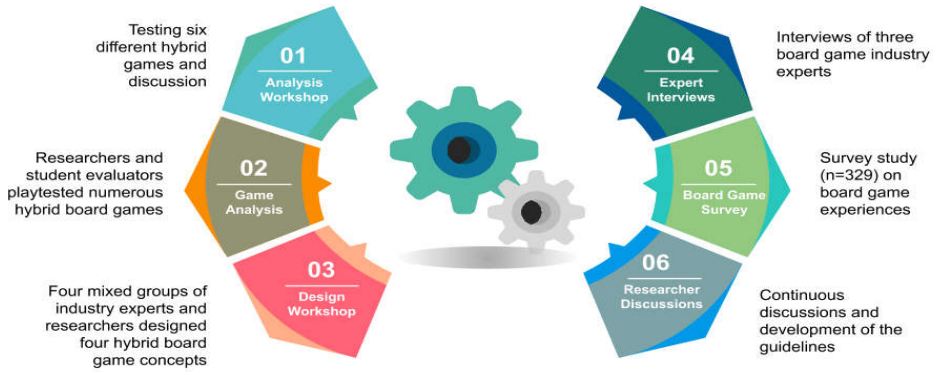



**Figure 1:** The design process of the Guidelines.

## The Analysis Workshop

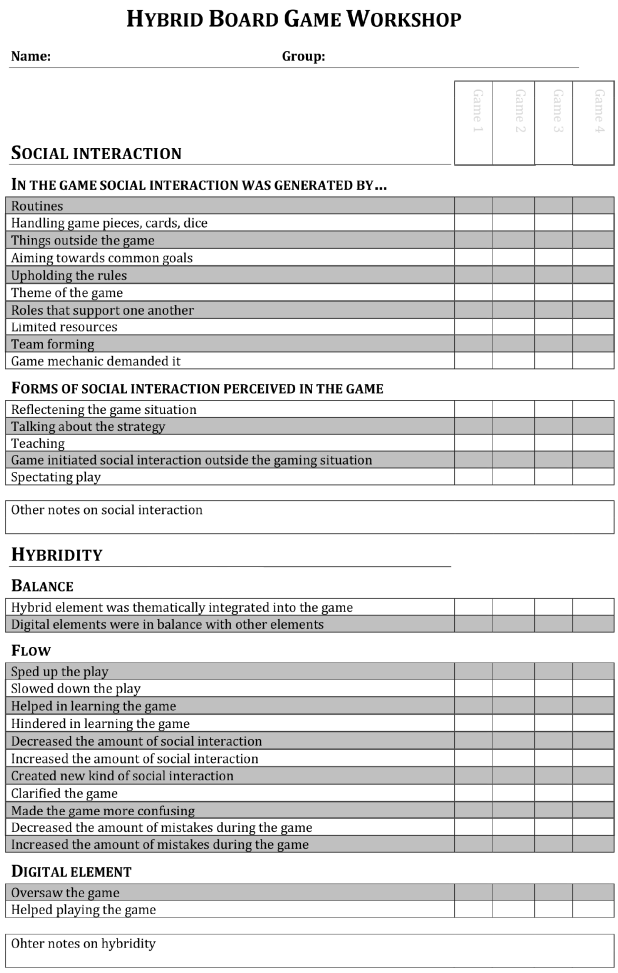
The analysis workshop took place in August 2016, where both industry experts and academic researchers discussed the current state of hybrid board games. There were 10 attendants, with four industry representatives and six researchers, excluding three researchers facilitating the workshop. The aim of the workshop was to discuss analytically with the industry representatives to understand how they perceive current solutions of hybridity in board games, and what they in general see valuable in hybridity.

The workshop started with a short introductory presentation by one of the researchers. The participants were then separated into two groups, which both had 60 minutes to familiarize themselves with a different set of games (see Figure 2). A separate researcher facilitated both groups. One group had three industry representatives with three academics and the other three academics with one industry person. Groups were formed on the basis that the participants could try out games that were new to them.

**Figure 2:** Workshoppers playing and evaluating the *XCOM: The Board Game* in the analysis workshop.

Three researchers, who had played them at least once, curated the games. They were chosen to represent various design approaches, and different types of social interaction in modern hybrid board games. Due to tight timeframe of the workshop, one criterion for the chosen games were that a meaningful part of the gameplay could be presented in 15 minutes. The focus was not in full-scale analysis, so much as in utilizing the tacit knowledge of industry partners along with their understanding of current prospects for hybrid products.

Games in the first set were Battlestar Galactica: The Board Game (Konieczka, 2008), World of Yo-Ho (Volymique, 2016) and Bycatch (Udaysankar et al. 2015). While in the second set there were: XCOM: The Board Game, Alchemists (Kotry 2014), Anki: Overdrive (Anki, 2015). Both sets had different games, as the purpose was to have a wide selection of games to inspire the discussion after the test session. Finally, all attendees were gathered together to test the One Night Ultimate Werewolf (Alspach & Okyi, 2014), in order to have all attendees have a shared experience in one game, and to break ice before the discussion. Participants were given forms to support their analysis (see Figure 3). The forms were created based on literature and analysis of existing games.



**HYBRID BOARD GAME WORKSHOP**

**Name:** **Group:**

| **SOCIAL INTERACTION** | Game 1 | Game 2 | Game 3 | Game 4 |
|---|---|---|---|---|
| **IN THE GAME SOCIAL INTERACTION WAS GENERATED BY...** | | | | |
| Routines | | | | |
| Handling game pieces, cards, dice | | | | |
| Things outside the game | | | | |
| Aiming towards common goals | | | | |
| Upholding the rules | | | | |
| Theme of the game | | | | |
| Roles that support one another | | | | |
| Limited resources | | | | |
| Team forming | | | | |
| Game mechanic demanded it | | | | |
| **FORMS OF SOCIAL INTERACTION PERCEIVED IN THE GAME** | | | | |
| Reflectening the game situation | | | | |
| Talking about the strategy | | | | |
| Teaching | | | | |
| Game initiated social interaction outside the gaming situation | | | | |
| Spectating play | | | | |
| Other notes on social interaction | | | | |
| **HYBRIDITY** | | | | |
| **BALANCE** | | | | |
| Hybrid element was thematically integrated into the game | | | | |
| Digital elements were in balance with other elements | | | | |
| **FLOW** | | | | |
| Sped up the play | | | | |
| Slowed down the play | | | | |
| Helped in learning the game | | | | |
| Hindered in learning the game | | | | |
| Decreased the amount of social interaction | | | | |
| Increased the amount of social interaction | | | | |
| Created new kind of social interaction | | | | |
| Clarified the game | | | | |
| Made the game more confusing | | | | |
| Decreased the amount of mistakes during the game | | | | |
| Increased the amount of mistakes during the game | | | | |
| **DIGITAL ELEMENT** | | | | |
| Oversaw the game | | | | |
| Helped playing the game | | | | |
| Ohter notes on hybridity | | | | |

**Figure 3:** The form that was used in the analysis workshop to support discussion.

After the test session, the groups had 30 minutes to discuss about the observations, and to come up with three design guidelines, which they then used to modify either an existing hybrid board game or a traditional one for 30 minutes. Both groups presented their guidelines and modifications to other participants. The guidelines created and presented by the participants were:

- Digitalize the most laborious tasks.
- Consider multisensory experience – especially audio.
- Universality – The digital element should work on multiple devices.
- Mind the cultural context – e.g. conversation culture.
- Hybridity should not reduce tacticity or sociality.
- Consider if hybridity can offer something that cannot be achieved otherwise.

The day was wrapped with a 30-minute open discussion, which was later analyzed. The analysis process involved three researchers using conventional qualitative content analysis (Hsieh & Shannon 2005) going through the transcribed discussions. After this researcher compared the code sets and by discussing formulated the initial set of 10 guidelines: Audiovisuality, Availability, Automation, Customization, Recovery, Scalability, Shareability, Tutorials, Universality, and Value.

## Board Game Survey

During the project, we conducted a survey study on board gaming in general, and the ways various electrical and digital elements are used in games or peripheral to them. The survey was online two weeks in December in 2016, and it had 329 respondents.[6] The employees of the project and project partners distributed the survey through email lists and on social media. Survey was further shared in online services by third parties. The survey had four parts: demographic information about the respondents, board gaming in general, the usage of electrical and digital elements and feedback on the survey. The data was a mix of qualitative and quantitative questions.

For the purposes of this study, two open-ended questions were analyzed. Both were follow-ups for quantitative questions. In the first quantitative question, respondents were asked whether any board game they had played contained mandatory electronic or digital elements with a list of 10 technologies like television, mobile phone or social media service. A four-point likert scale was provided, with options never, sometimes, often, always. In the follow-up question, they were asked what kind of games these were, with 133 responses.

In the second quantitative question, they were asked to evaluate set of eight claims[7] about digitality in board games using similar likert scale. In the follow-up question, they were again asked to explicate their answers, with 132 responses. Quantitative responses were not analyzed for this study, as the aim was to identify the nature of player experiences.

One researcher read all open-ended questions highlighting phrases that supported the initial guidelines or provided inspiration for new ones. Informed by this analysis and with growing understanding of the phenomenon, the list of guidelines was reformulated and extended to thirteen: Added Value, Aesthetics, Automatization, Availability, Customizability, House Rules, Recovery, Scalability, Shareability, Sociability, Tutorials, and Universality.

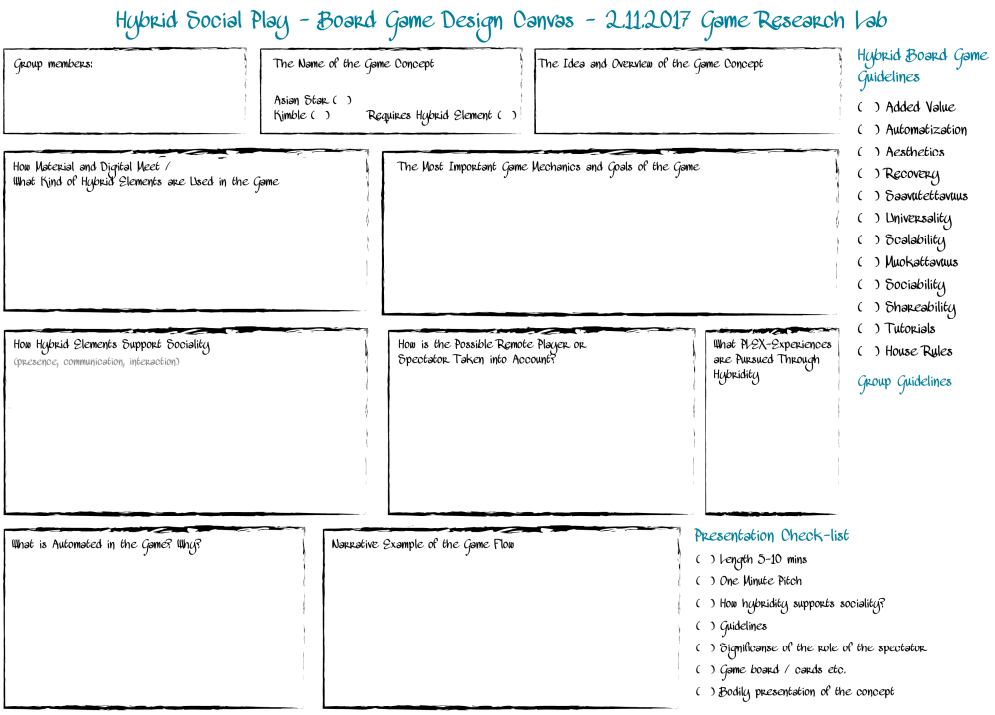



**Figure 4:** The design canvas that was used in the hybrid board game design workshop.

## The Design Workshop

The design workshop was held in November 2017, with 15 participants excluding one researcher facilitating the workshop. There were ten industry representatives and five academic researchers present. The goal was to develop hybrid board game concepts, to test the guidelines and collect data for advancing them further. The focus was again on the discussion.

Four groups were formed with one researcher in three of them and two in one. The workshop started with presentations from both the board game and toy company hosting the event, and the research team. Presentations were followed by an icebreaker task, which consisted of watching trailer videos (Yo-Ho, 2014; Sensible Object, 2016; GIFT10TV, 2016) of three hybrid games: World of Yo-Ho, Beasts of Balance, and Mask of Anubis (Hamada & Shimojima, 2016) and discussing about them in groups. The games were chosen on the basis that they represented different approach to hybrid board game design. Based on the discussions, the participants were encouraged to write down one design guideline each. There were 15 guidelines in total, and they were at the disposal of each team for inspiring the design work.

Before the design phase started, the research team presented the preliminary version of HBG design guidelines created after the first workshop. These were also written in the design canvas used in the workshop (see Figure 4).[8] In addition to documenting the design process, the groups were asked to write down two or three new design guidelines they came up during the process. Canvases were collected after the workshop for analysis purposes.

The basis of the design work were two classic board games, Afrikan tähti ("Star of Africa"; Mannerla, 1951) and Kimble (Heljakka, 1967). The groups were to design a hybrid version from either game. Three teams worked on the former while one team focused on the latter. Halfway through the workshop each group received a deck of PLEX-cards (Lucero & Arrasvuori, 2010) to further inspire the design. The teams

were also asked to draft a game board for the presentations. Three groups came up with working HBG concepts (See Figure 5), while one failed to produce one, succumbing to a "feature creep". The final discussion on the concepts and the design process was recorded for the analysis purposes.

Two researchers compared the developed concepts to the preliminary guidelines to find out possible new guidelines and to verify previous findings. Transliterated discussion was again analyzed through conventional content analysis. Results were documented on a workshop report that was delivered to the project participants. This report was also used for develop the guidelines further. The other design workshops focusing on money games, transmedia, and toys were organized and analyzed in similar fashion.

The transcribed discussion was analyzed like in the previous workshop. Results were documented on a workshop report that was delivered to the project participants. Two researchers compared the developed concepts and analysis results to the preliminary guidelines to find out possible new ones, and to verify previous findings.


**Figure 5:** A comic strip of a hybrid board game concept *Electro Kimble*, that was created in the design workshop. Copyright: Nancy Nilsson 2018.

## Developer Interviews

Three board game developer interviews were used to inform the development of the design guidelines. Interviewees worked as a CEO, project manager and game designer in a large board game developing company that mainly produces family games. One researcher conducted the interviews face-to-face with the interviewees. They were inquired how they understand hybridity in board games, what kind of hybrid board game projects they have worked with, what kind of design solutions they have made in them, and what are the challenges of hybrid board game design. Transliterated interviews were then analyzed by two researchers, using conventional qualitative content analysis (Hsieh & Shannon 2005). The findings were used to evaluate the existing guidelines.

## DESIGN GUIDELINES

Based on the research and workshop findings we present a set of 17 design guidelines for HBGs (Table 1). These guidelines can be also applied for evaluation purposes. The nature of these guidelines is not "be-all-end-all" but to act as a starting point and inspiration when working with HBGs. These design guidelines are generic so that they can be utilized in a variety of other contexts and platforms.

| | | | | | |
|---|---|---|---|---|---|
| **1.** | Accessibility | **7.** | Universality | **13.** | Tutorials |
| **2.** | Added value | **8.** | Scalability | **14.** | Modifiable Rules |
| **3.** | Automation | **9.** | Obsolescence | **15.** | Tangibility |
| **4.** | Aesthetics | **10.** | Customizability | **16.** | Parallel Play |
| **5.** | Recovery | **11.** | Sociability | **17.** | Integration |
| **6.** | Availability | **12.** | Shareability | | |

**Table 1**: Design Guidelines for Hybrid Board Games

## 1. Accessibility

In addition to "regular" accessibility issues related to board games (see Heron et al. 2018), new technology and novel approaches can alienate users hence accessibility and ease of use are critical for creating positive first-time experience. The hybrid element can lower the setup time, and as such make the game easier to use. A familiar theme or brand can help a new player to get over the threshold created by unfamiliar technology. On the other hand, tangible elements are good at communicating the game state, and familiar board game elements can lower the threshold of entry for many.

*Beasts of Balance* is an analog tower building game with a digital world presented on a tablet device. The game uses a familiar and intuitive game mechanic of stacking that is easy to understand – but hard to master. *Dized* (Playmore Games 2018) is an application that helps the players to learn the rules and to setup a board game. *Pokémon GO*, though not a board game, is based on a world-famous brand that invites the players into the world of location-based augmented reality gaming with mobile phone.

## 2. Added Value

The role of digital elements is to enrich the game experience. The hybrid board game should provide added value that is meaningful for the players. There are several ways to utilize this guideline:

1. Exchange an analog component for a digital component
2. Expand the game with digital features
3. Extend some non-digital feature with digital one.

*Space Alert* (Chvátil, 2008) uses pre-recorded voice commands to guide the game and enrich the atmosphere. *XCOM: The Board Game* uses a digital device to facilitate turn-taking and storytelling, thus making the game easy to run.

## 3. Automation

Arduous and boring tasks can be automated. Bookkeeping can be error prone, time consuming, and boring, but an application can take care of it faster and more accurately. The digital element can be used to replace a human game master, letting all the players play together against the game. Automation prevents errors, mistakes, and cheating (if that is desired). Too much automation can, however, diminish the enjoyment, or make the game flow hard to follow.

*XCOM: The Board Game* takes care of bookkeeping automatically through an application. In *Golem Arcana* (Johnson et al. 2014) movement and combat is calculated by the application, though it can be done manually as well. In *Mansions of Madness: 2nd Edition* (Valens, 2016) the digital application replaces a human game master, allowing all players to play against the game.

## 4. Aesthetics

Utilize all audiovisual possibilities. Different game events can have images, video, music or sound effects attached. It is not unusual for the players to listen to music to add to the atmosphere of the game. The possible use of music and soundscapes should be considered in the game design as well. Further, digital elements are good for adding narrative elements, for example letting players listen to narrative text pieces instead of reading them.

Animations, video, augmented or virtual reality can be used to enrich the visual experience. World of Yo-Ho contains animations of moving ships and naval battles. The audio repository *Deep Space Assault Console* (Lyons, 2009) provides sound effects for the *Space Hulk* (Halliwell, 2008) board game. In *Mansions of the Madness: 2nd Edition*, the application provides context-based flavor texts for the players, in addition to music, narration and sound effects. *Mask of Moai* (Hamada, 2017) utilizes virtual reality for the players to study surroundings in the board game world.

## 5. Recovery

It is plausible that the digital application or technology in general used by the game will fail at some point. The game should be able to recover from such errors quickly and gracefully. Whether it is a network connection problem or crashing of the application, the players should be able to continue playing without losing the game state. Another perspective is to use the failure as a game mechanic and exploit the situation for the benefit of game experience.

In *Alchemists* the game generates a four-letter seed for each game, which can be used to reload that specific starting configuration. *LEADERS: A Combined Game* (Kern et al. 2013) can end in a stalemate if there is an error accessing web resources.

## 6. Availability

Utilizing existing technology like personal devices makes the game more accessible. Rather than designing new technology just for the game, it could be more feasible to use existing technology and utilize it in a novel way. For example, mobile phones have many technological affordances that can be used for playful purposes.

In *ByCatch* the players can use any kind of mobile phone with a camera, or a digital camera. In comparison, *Golem Arcana* uses a stylized proprietary stylus pen that can be only used in that game.

## 7. Universality

In analog board games, missing game pieces can be replaced with relative ease. With digital elements there is a danger that the game is not playable if the application does not work under certain conditions. As such, game applications should work on as many devices as possible. Backward compatibility is important, as the digital element might not be the main feature of the game, but still required to play the game.

The mobile version of *Settlers of Catan* (United Soft Media Verlag GmbH, 2010) is a good example on backward compatibility. It works on Android version 2.3.3, while the current version is 9.

## 8. Obsolescence

Digital applications often have shorter life spans than physical board games. Part of the charm of board games is that the player can dig out an old game from the attic and play it even after decades. Adding digital elements should not make the board game unplayable with passing time. Can the game be designed in such a way that it is playable without the digital element?

In *Alchemists* the digital application is not mandatory as one player can keep track of the deductions made in the game with a cardboard board designed for that purpose.

## 9. Scalability

Digital elements make it possible to add new features in the hybrid board game later. Like video games, HBGs could be updated as time goes by. Random encounters, game items and other game data can be easily added, removed and edited if they are handled by the application.

Players of *Descent: Journeys in the Dark* (Clark et al 2012) are shown hidden information on the game state based on what expansions are in use.

## 10. Customizability

The possibility to customize their game experience provides ownership for the players. The Legacy series of board games, e.g. *Pandemic Legacy* (Daviau, 2015), that afford customizing the game board with stickers have been popular in recent years. Digital technology can offer new ways to add customizability to HBGs. Digital elements could add the possibility for the players to add new content to the board game in a similar way as user-created content is apparent in video games.

*Posthuman* (Calleja, 2015) lets the players to create their own characters. *Anki Overdrive* encourages players to design their own racetracks and additional track pieces are sold for that purpose.

## 11. Sociability

Sociability is an integral part of play and the digital element can be used to enrich sociability in new ways. Presenting player-specific imperfect information about the game state via application is one method to enrich sociability (e.g. social tension, bluffing). The digital element should introduce new social features to the game play situation - not inhibit the inherent sociability of board gaming. It should support different levels of sociability rather than drawing the players' attention away from the social play situation towards their personal devices. The three levels of sociability (Paavilainen et al. 2017) are:

- Presence – acknowledging that there are other players or spectators (tele)present in the same physical space or over the network.
- Communication – the possibility of communicating through the game (text, voice, emoji, gestures etc.) either publicly or privately.
- Interaction – conflict and cooperation through gameplay mechanics.

*LEADERS: A Combined Game* allows players to spy each other via mobile application. In *World of Yo-Ho* mobile phones are used to present movement and animated battles. *Mask of Moai* is based on sociability between VR headset user and other players. *The Eye of Judgement* (Miyaki & Watanabe, 2007) allows online multiplayer gaming while using physical cards with the game.

## 12. Shareability

Sharing experiences on social media is an important part of present-day game play. Players often share pictures and videos from their game sessions and discuss their experiences online. Such activities could be supported in HBGs through the digital application. Social media integration could be also used as gameplay mechanic where likes and comments are used for playful purposes.

Currently there are no great examples of this, but for example in *XCOM: The Board Game* where the play is strongly facilitated by the application, it would be rather easy to allow the players to share the result from the game to social media.

## 13. Tutorials

Reading the rulebook before getting to play is often an arduous task, especially for more complex board games. A digital tutorial allows players to engage with the game right after unboxing it. Currently developers and users share videos online where the board game rules are explained. Such videos are also used for marketing purposes. HBGs are relatively new, thus examples from the game play are beneficial for lowering the threshold to try out new games as players might not have previous experiences from such games.

*Dized* is a mobile application created to teach board game rules while playing. The application uses animations and gives instructions on how to proceed with the game. *XCOM: The Board Game* has a tutorial scenario to teach the players the game rules. Digital adaptations of board games use tutorials to teach the gameplay as well.

## 14. Modifiable Rules

The flexibility and the possibility to modify the rules is an important element in board game experience (see Cheung et al. 2013). Players also like coming up with house rules, for example to suit their style of play, or to fix design flaws in the game. As such, the digital elements should not restrict this flexibility too much.

In *XCOM: The Board Game* players can disable the timer via the difficulty setting. Games with dice can be easily modified to use different probabilities. Games with resource tokens can be modified for different starting setups.

## 15. Tangibility

Tangible physical objects are easy to grasp and use. Handling physical objects can give players a feeling of ownership over what happens in the game, for example as a result of a die roll or by picking a card from a player's hand. Physical game pieces also allow players to fiddle with them between turns, which can keep them more engaged with the game and offers material pleasure. Physical elements also offer aesthetic pleasure to the players and are often in the center of attention. As noted in the related literature, tangibility is important factor in board game enjoyment, and design choices should be made this in mind.

*Beasts of Balance* uses physical plastic animals as part of digital gameplay. Stacking the physical animals is fun while the digital element adds another layer of enjoyment to the game. *XCOM: The Board Game* comes with custom-made dice for rolling the outcomes for conflicts. *Alchemists* and *XCOM: The Board Game* are both rich with tangible game elements, such as tokens and cards. *Golem Arcana* features beautifully crafted miniature creatures. On the other hand, *World of Yo-Ho* has beautiful game board, but lacks game pieces apart from players' mobile phones, which can affect negatively towards the enjoyment of the game.

## 16. Parallel Play

In hybrid games, the physical and digital element can also be asynchronous and independent of each other (Tyni et al. 2013). Players can for example practice play strategies on digital adaptations of board games and bring the learned strategies to play when engaging with the physical version of the game (Kankainen 2016). Players often play both the digital and physical version of the same board game (cf. Rogerson et al. 2016).

Various digital versions of *Blood Bowl* (Johnson 1986; 1988; 1994; 2016) board game are popular amongst the players of the physical game (Kankainen 2016). The digital version of *Ticket to Ride* (Days of Wonder 2011) increased the sales of the physical version and vice versa (Melby 2013).

## 17. Integration

The digital element should be a well-designed part of the game. This often works best if it is designed into the game from the beginning, but even if it is added later it should be justified part of the overall game experience. Adding a poorly designed hybrid element often does not bring the desired added value.

In *XCOM: The Board Game* the digital element has been well integrated both, into the theme of the game and as a game play element. Using the application is the responsibility of Central Officer, one of the four roles players choose in the game. Thematically that is the role, which controls the flow of resources and communications, so using the app does come natural for the role. In *Alchemists,* the digital element is used to mix magic potions. It is used to conduct activity that in the game world needs magic, which integrates it quite well into the game theme.

# DISCUSSION

Our work builds on and expands on principles presented in related literature (Koeffel et al. 2010; Cheung et al. 2013; Bergström & Björk 2014) but is more heavily influenced by the input of the industry experts by utilizing their tacit knowledge of design praxis and hybrid games. In addition to providing an analytical tool for

mapping the design space of HBGs, our guidelines also offer a description of the phenomenon. They should not be approached as answers, but as questions, a source of inspiration and as a starting point for the development work.

The length and scope of this research project provides many perspectives for reflection and critique. By utilizing mixed methods approach we have tried to study the phenomenon from different perspectives in an exploratory manner. While this approach has provided certain breadth for our design knowledge findings, focusing more on certain methods (e.g. interviews) could have provided deeper understanding. The game examples used in the workshops have most probably guided the discussion to certain areas while neglecting others and although there were also full day workshops, it seemed there could always be more time to play, analyse, and design games with industry experts and academic scholars. Nevertheless, we consider our approach feasible, providing more questions and opportunities to study the design of hybrid board games more deeply.

Game design, as any design practice, is always dependent on designers' personal beliefs, attitudes and values, and choices relating to them (Kultima & Sandovar 2016; Flanagan et al. 2005). For example, the proprietary stylus pen used in Golem Arcana hardly meets the guideline of availability, but the aesthetic qualities of the pen go well with the lore and atmosphere of the game.

Similarly, in the World of Yo-Ho, the digital animations are aesthetically pleasing, the non-digital graphics of the game are high quality and atmospheric, while the app allows a level of complexity in game mechanics that would make analog game cumbersome. However, the lack of physical elements overlooks the Tangibility guideline, while the need for the players to frequently engage with their mobile phones lowers the social presence during the game. Understanding and navigating between the trade-offs for good design is the practical reality in the game industry, hence it is important to understand the design rules and heuristics - and break them when it is necessary and justified (Paavilainen et al., 2018).

Currently, the number of guidelines is quite high. It is feasible to merge some of the guidelines while adding new ones that have been missed. For example, Universality and Obsolescence are partly overlapping and could possibly be combined. In order to further develop the guidelines and to comprehensively test their applicability for design, more research is needed. Guidelines could also be developed into a more detailed model describing HBGs.

Although hybrid game design provides many new opportunities, there are also pitfalls that should be considered. For example, the digital layer should not automate activities that are fun for the players - like handing out cards to each other. The digital layer should try to support these activities rather than making them less meaningful due automation. Similarly, the game should not force the players to focus only on their devices. Adding technology just because it is possible is not good design, as it can make the game more cumbersome than it must be. Complexity should not be added without clear reason to do so and the role of technology should be to enhance the social game experience. Although it is very general as a guideline - even to the extent of being self-evident - added value is very important in this regard, as there might be a temptation for developers to add digital elements to analog games without deeper consideration just to keep in with the current trends.

Novelty seems to be one of the selling points of HBGs, and publishers often advertise their solution as a groundbreaking one. This sells some games but does not seem to carry on for durable popularity, and some games referred in this study, like *Eye of*

*Judgement*, can already be considered obsolete. However, hybridity does not seem to be a passing trend, as new games are published steadily, and old games are recreated with modern technology. For example, Restoration games have published new version (Daviau et al. 2017) of old classic from 1979, *Stop Thief!* (Doyle), and are on the works (Kutchera 2018) of releasing an adaptation of one of the 1980s classics, the *Dark Tower* (Burten & Erato 1981).

Although HBGs are quite marginal phenomenon themselves, they do not exist in a vacuum, and the current trends in board game cultures reflect larger societal developments as well. The way HBGs (like *XCOM: The Board Game*), and board games in general, reuse and repurpose the content (and techniques, see Manovich 2007) of other media formats, connects them to the larger media environment (Booth 2015) and to the convergence culture (Jenkins 2006).

By expanding our understanding of hybrid play in lines with Jayemanne et al. (2016), we can see how the current networked culture offers numerous affordances for emergent hybrid experiences. Trammell (2019) touches the topic by contextualizing analog games in the digital economies, providing examples how digital forums drive analog game design, digital tools needed to make them and how fan labour is instrumental in growing success of board gaming.

Indeed, board games should be observed in the wider perspective of digital culture, in order to understand the economic, cultural and technological possibilities surrounding them. In the future studies, we will focus on mapping the hybrid ecosystem of modern board games, and the creative digital practices surrounding them.

## CONCLUSIONS

In this paper we have presented 17 design guidelines for hybrid board games. They are the result of an iterative process of workshopping with industry experts and academic researchers, supported by developer interviews and player survey. They are presented as starting points for hybrid board game design and aim to help the designers to avoid common pitfalls and evaluate different trade-offs. At the same time, they describe the phenomenon and the current situation in the field.

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## ENDNOTES

[1] Gameplay (noun, compound word) is a reference to the dynamic interaction of game mechanics; game play (verb, non-compound word) refers to the activity of playing a game (White 2014, p. 224)

[2] Refers to the way games create meaning through play, and how other games create more meaning than others. (Salen & Zimmerman 2013, 37.)

[3] From the January 2018 onwards Business Finland: https://www.businessfinland.fi/

[4] In addition to these two workshops, there were four other workshops focusing on other hybrid products and services that had also tangential effect on the iterative development process of the guidelines.

[5] This term refers to the non-academic theoretical understanding of industry experts. Although he warns about losing the critical perspective to the research, as industry theorizing is driven by commercial interests, he supports the idea of bringing both sides on the same table: "This kind of dialogue would enable us to discern areas of common and divergent interest but would also provide at least a minimal opportunity to compare our assumptions and findings with those of the industry" (Caldwell 2009).

[6] Of all respondents, 174 were female, 142 male, 7 others, while 6 did not want to tell their gender. Of them 182 identified themselves as board gamers, 110 non-gamers and 36 could not tell are they gamers or not.

[7] Claims were for example: "digitality has felt as natural part of the game", "digitality has hindered playing board games" or "digitality has brought added value to the game".

[8] The design of the canvas was based on previous literature, results from the analysis workshop and researchers' experience on playing and analysing HBGs.