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## **Exploring Continuity in Transmedial Play**

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*To my family.*



## Resumo

Ao longo dos anos, os jogos híbridos (jogos que combinam o meio físico e o meio digital) têm vindo a ganhar atenção tanto por parte da investigação como da indústria. A investigação nesta área tem procurado potenciar as experiências de jogos analógicos e digitais, alimentando um jogo com os benefícios de cada meio.

Na maioria dos jogos híbridos, ambos os meios são combinados e estão presentes na mesma sessão de jogo, sendo que um dos elementos — analógico ou digital — assume frequentemente um papel mais secundário (por exemplo, narração por áudio) e, muitas vezes, obrigatório. Esta abordagem apesar de ser promissora pode limitar o potencial de ambos os meios e levar os jogadores a perceberem determinados componentes como disruptivos, em vez de complementares à experiência de jogo, o que os leva a optar por jogar jogos completamente analógicos ou digitais.

Este trabalho propõe uma abordagem alternativa (**Transmedial Play**) que, em vez de integrar os meios digital e analógico numa única sessão de jogo, separa-os em sessões de jogo distintas — analógicas e digitais — dando na mesma ao jogador a percepção de que ambas as sessões fazem parte de um único jogo contínuo.

Para concretizar esta abordagem, começámos por conduzir um estudo com o objetivo de compreender como os jogadores percebem a continuidade num jogo, tanto em jogos analógicos como em jogos digitais (isto é, como e quando sentem que um jogo continua ao longo de múltiplas sessões de jogo). Também exploramos que compromissos e desafios podem estar associados a este sentimento, e ao design da própria continuidade no jogo. Adicionalmente também procurámos compreender de que forma é que os participantes imaginam que a continuidade poderia ser alcançada em experiências de jogo transmedial contínuas (**Continuous Transmedial Play**).

Percebemos que a continuidade pode estar ligada a variados fatores, tanto como ao próprio jogador em si, como ao jogo e às pessoas envolvidas na experiência. Pode estar ligada ao progresso do próprio jogador, tanto narrativamente, como o progresso ligado à sua personagem. Mas pode ser muito mais do que isto, pode estar ligado à sensação interna de aprendizagem e treino no próprio jogo, e também pode estar ligada ao grupo com o qual partilhamos a experiência, que acaba por se tornar única.

A abordagem de **Transmedial Play** foi recebida positivamente e valorizada por dar aos jogadores mais flexibilidade de como continuam a jogar, por exemplo em vez do grupo ter de alinhar os seus horários para uma sessão de jogo físico, esta pode ser feita através do meio digital ou até mesmo sem precisarem de todos os elementos do grupo para jogarem. Para além dos be-

nefícios encontramos também vários desafios que podem estar associados a este fator, por exemplo, levar jogadores a sentirem-se de parte se tiverem menos tempo para jogar ou se tiverem uma discrepância de progresso muito grande de outros jogadores.

Sobre **Transmedial Play**, os participantes mencionaram que uma das suas preocupações era tornar os meios dependentes, ou seja precisarmos de avançar num meio para progredirmos no outro, e que isto poderia levar até aos jogadores desistirem de jogar.

Com base nos resultados deste primeiro estudo, concebemos e desenvolvemos um protótipo digital que estende o jogo de tabuleiro Tidal Blades 2: Rise of the Unfolders com o objetivo de este ser percebido como uma continuação da experiência do jogo de tabuleiro. O protótipo foi desenhado de acordo com os elementos da continuidade e oportunidades de design mencionadas pelos participantes, por exemplo tornar o jogo mais flexível e permitir que os jogadores não precisem do resto do grupo para continuar a jogar. A progressão do jogo e personagens, foi feita através de desafios diários com recompensas, desenvolvimento da narrativa através de eventos, e através de compra de novas cartas. Para a aprendizagem implementámos um modo de jogo, a Arena, onde os jogadores podem treinar com novas cartas adquiridas e até mesmo aprender mecânicas do jogo que estarão presentes na próxima sessão física. Para a socialização entre jogadores implementámos maneiras dos jogadores sentirem que estão presentes no jogo um do outro mesmo jogando em tempos separados, por exemplo desbloqueando novos eventos e desafios um para o outro ou contribuírem para uma pontuação conjunta nesses desafios.

Como etapa final, realizámos um estudo com utilizadores no qual o protótipo foi utilizado como suporte para explorar de que forma é que Transmedial Play pode afetar a experiência dos jogadores — nomeadamente aspetos como a vontade de jogar e motivação, o sentido de continuidade e a experiência de jogo em grupo. Para além deste entendimento, os participantes também mencionam que decisões no design podem promover ou dificultar estes aspetos.

Descobrimos que a nossa abordagem se pode adaptar a vários contextos e preferências e como podemos fazer esta adaptação, por exemplo se os jogadores preferirem só jogar uma das partes (físico ou digital) e o resto do grupo jogar a outra parte ou se um jogador preferir que o impacto entre meios seja meramente narrativo, mecânico ou algo entre estes aspetos de um jogo. Os participantes também referiram ter diferentes preferências sobre o nível de dependência entre meios, e que impacto é que o tempo que um jogador passa a jogar poderia ter na próxima sessão. Num nível mais dependente os meios podem desbloquear novo conteúdo que pode ser usado nas próximas sessões de jogo e num nível mais baixo um dos meios poderia servir como maneira de fornecer mais informação ao jogador narrativa ao jogador.

Com este estudo percebemos que **Transmedial Play** é vista como algo que transcende apenas a sessão de jogo, uma maneira de os jogadores estarem envolvidos num mundo contínuo que não se fecha. As nossas contribuições são:

- Uma primeira compreensão de como os jogadores percebem a sensação de continuidade nos jogos (analógicos, digitais e entre diferentes meios), através de um estudo com utilizadores que recorreu a uma análise qualitativa com 12 jogadores de jogos analógicos e

digitais [34]

- Uma aplicação de prova de conceito, baseada nos resultados deste primeiro estudo, concebida para ser percebida como uma continuação do jogo após sessões de jogo físico.
- Uma compreensão mais aprofundada da nossa abordagem (Continuous Transmedial Play), através de um estudo com utilizadores, que envolveu grupos de jogadores de jogos de tabuleiro (2–3 participantes por grupo, num total de 15 participantes), em que os participantes jogaram duas sessões de um jogo de campanha comercializado (jogo com múltiplos capítulos) e, entre sessões interagiram com o protótipo desenvolvido.

Acreditamos, e neste trabalho é patente, que o valor de incluir mais do que um meio em Transmedial Play pode ir para além do que experiências de jogo completamente analógicas ou digitais conseguem oferecer sozinhas. Defendemos que pode ser a experiência para jogadores que queiram estar continuamente imersos num ambiente de jogo, que não se fecha no fim de cada sessão. Esta abordagem partiu de um jogo de tabuleiro para Transmedial Play, no entanto acreditamos que uma abordagem que parta de um jogo digital para Transmedial Play possa oferecer perspetivas interessantes neste campo.

**Palavras-chave:** Jogos Híbridos, Jogos Transmediais, Jogos de Tabuleiro, Jogos Digitais, Continuidade em Jogos



## Abstract

Over the years, hybrid games have gained increasing attention. Research in gaming hybridity has sought to enhance analog and digital game experiences by leveraging the unique affordances and benefits of both mediums. In most hybrid games, both mediums are blended in the experience in the same game session, with one element — either analog or digital — assuming a supportive role (e.g., narration), which can undermine the potential of both mediums. This imbalance may lead players to perceive certain components as disruptive rather than complementary in the experience. This work proposes an approach that enables players to engage with a hybrid gaming experience across separate analog and digital sessions, promoting a seamless and interconnected experience across mediums. The ultimate goal is to understand how this type of experience shapes players' perceptions of hybrid play while leveraging the unique benefits and affordances of each medium at different times.

To achieve this, we first conducted a study to examine how players perceive a sense of continuous play across analog and digital games, and explore the tradeoffs associated with designing for continuity based on insights from prior player experiences. Second and based on the previous step, we designed and developed a digital prototype as an extension to the board game *Tidal Blades 2: Rise of The Unfolders*<sup>1</sup>. To complement this step, we conducted a user study with the prototype, where 15 participants (7 groups) perceived it as a continuation of play. Transmedial play was perceived positively, a way for players to feel continuously connected to the game world. This study provides insights into the different ways mediums can connect in transmedial play, for example through different contexts (e.g., preferring to only play in one medium) or preferences, as well as new avenues in game research.

**Keywords:** Hybrid games, Transmedial Play, Board Games, Digital Games, Continuity

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<sup>1</sup>Tidal Blades 2: Rise of the Unfolders. <https://boardgamegeek.com/boardgame/233261/tidal-blades-2-rise-of-the-unfolders>



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# Chapter 1

## Introduction

Over the years, hybrid games (i.e., games which include both analog and digital mediums) have gained increasing attention [105, 99, 31, 105, 100, 62, 124]. Research in gaming hybridity [105, 99, 31, 105, 100, 62, 124] has sought to enhance analog and digital game experiences by leveraging the unique affordances and benefits of both mediums (e.g. increase immersion in board game play by adding sounds).

In most hybrid games, both mediums are blended in the experience in the same game session, with one element — either analog or digital — assuming a more supportive (e.g., narration) and often mandatory role, which can undermine the potential of both mediums and lead players to perceive certain components as disruptive, rather than complementary in the experience [79, 119, 105, 100, 94, 99].

### 1.1 Motivation

Gaming offers numerous potential benefits, such as coping with anxiety, fostering social bonding, and serving as a creative outlet [111], fostering social bonding [36]. Both board and digital games provide distinct advantages due to their different modalities of play [35, 95]. Digital games leverage technology in order to create dynamic interactions between players, and more accessible environments through remote play and automation of features [16]. In contrast, the social experience of board games can be enhanced by their inherent physicality and spontaneous interactions emerging from player-driven norms [95].

Hybrid games represent new opportunities in game design, offering experiences that neither digital or board games can achieve independently [105, 99]. Research [62, 89, 124, 67, 68] has focused on hybridity to support distanced analog play, as well as developing board game apps [100] and tangible components to enrich the digital experience [46, 109]. However, many hybrid games fail to deliver a seamless experience [117, 48], as they are not initially designed to fully integrate both analog and digital elements and these are instead added as an afterthought [99] (e.g., digital element adds background music or acts as a narrator [100]).

This reveals a gap in the hybrid experience, as it cannot fully capture the potential of digital and analog elements leading to players thinking negatively about hybrid games [62, 99].

## 1.2 Approach

To address this gap, we analyzed player perspectives on continuous transmedial play — a play experience where players can engage with a game through either analog and digital means in different moments, while still feeling as though they are continuing the same game. We speculated that exploring how players perceive the sense of continuity (i.e., how players perceive they are continuing a game over multiple sessions) in analog and digital play sessions could provide valuable insights into creating seamless transitions between mediums (analog or digital). [106, 66, 49, 47].

To achieve this, we first conducted a study to examine how players perceive continuous play across analog and digital games, and explore the tradeoffs associated with designing for continuity based on insights from prior player experiences in both analog and digital games. Additionally, we also asked participants how they imagined continuity could be achieved in transmedial play.

Second and based on the previous step, we designed and developed a digital prototype that extends a board game, with the goal of it being perceived as a continuation of play after physical game sessions. As the final step we conducted a user study where the prototype was used as support to explore how transmedial play affects the player experience (engagement, sense of continuity and group play) as well as what design choices can hinder and promote these aspects.

## 1.3 Contributions

- A first understanding of how players perceive continuity in games (analog, digital and between mediums), through a user study which used a mixed-method analysis of 12 gamers of both analog and digital games (published in [34])
- A proof of concept application based on the findings of this first study, which was designed to be perceived as a continuation of play after physical play sessions.
- A deeper understanding into continuous transmedial play through a user study with groups of board gamers (2-3 participants in each group with a total of 15 participants), where participants played two sessions of a commercialized campaign game (game with multiple chapters), and in between sessions engaged with the developed prototype.

## 1.4 Structure

- **Chapter 2 – Related Work.** Understanding of the advantages of analog, digital, hybrid games and how transmediality can expand the play experience, as well as what defines these forms of play.
- **Chapter 3 - Exploring Continuity in Games.** Introduction of the concept of continuity between game sessions, and the findings from our first study on understanding how it can affect the player experience.

- **Chapter 4 - Designing for Continuous Transmedial Play and Implementation.** Insights into the design thoughts behind the digital prototype and an understanding of the process behind the development of the prototype, the tools utilized and the systems implemented.
- **Chapter 5 - Evaluating Continuous Transmedial Play.** Understanding of the evaluation protocol undertaken, encompassing participants' perceptions on transmedial play, and a discussion on the implications surrounding transmedial play.
- **Chapter 6 - Conclusion and Future Work.** A summary of the conducted work, discussion of its limitations, and exploration of potential avenues for future research.



## Chapter 2

# Related Work

In this section, we first introduce games and benefits common to both analog and digital forms of play. We then delve into the specificities that characterize analog and digital gaming experiences. Finally, we conclude with sections that describe current approaches to hybrid games and describe processes and challenges behind their design.

### 2.1 Games and their benefits

The benefits of gaming have been extensively researched in the past, with distinct approaches to further explore its outcomes [35, 88, 36, 84, 76].

Research has shown gaming can provide a range of cognitive skills associated with developing problem-solving techniques and enhanced creativity [35, 36, 14, 39, 65]. Games are often designed to be challenging and have meaningful goals that lead players to be continuously engaged in trying to overcome them [112, 35]. Triumphant over a complex challenge has demonstrated to give players a sense of achievement [118].

Gaming environments have also shown to encourage an optimistic motivation mindset which can extend to school and work contexts [14], and to provide emotional benefits, such as generating positive feelings [36, 35], with some studies demonstrating improved mood and increased positive emotions in participants after a play session [36]. Some works also suggest that players may feel immersion and transportation when playing, leading to a sense of loss-consciousness [35, 61]. Immersive experiences have been linked to positive outcomes such as diminished anxiety and enhanced self-esteem [111, 36].

Previous works have studied the social outcomes of gaming and how they can foster a sense of belonging through social interactions [35, 36]. Games can be played in different settings, by including multiple players or played alone. Players often turn to gaming as a means to connect with friends and sustain social bonds, frequently using it as a shared interest in their conversations [114, 35]. Play sessions often encourage social interactions that extend beyond the game itself [36]. The emergence of gaming has led to the creation of social platforms like Twitch <sup>1</sup>

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<sup>1</sup>Twitch.<https://www.twitch.tv>

and BoardGameGeek<sup>2</sup>, designed to support communication among players [26, 99]. Gaming is surrounded by communities that often gather at larger events in order to play newer games and connect with people who share similar interests [88, 95, 96, 93, 88].

While many of these benefits are present for both analog and digital play, each medium has its own particularities.

## 2.2 Understanding Analog Games

Research has explored the benefits of many analog forms of play which include board gaming, card games, party games, role playing games [95], and even toys [117], which are often linked to the materiality of game components [95, 99] and social interactions fostered by collocated play [19, 95].

Board games, in particular, can be categorized based on theme, objectives, and unique mechanics that shape player interactions and strategies [104]. Some studies [104, 103] have addressed board game mechanics by studying the interdependencies between them, and showed that mechanics are often designed with others in mind (e.g., worker-placement and turn order). There are examples [104, 21, 29] of exhaustive categorizations of mechanics. Games that combine mechanics lead to synergies that elevate the complexity and strategic depth of gameplay (e.g., worker placement and auctions) [104, 103]. Acting upon mechanics can also affect group dynamics, leading to unexpected behaviors between players (e.g., forming alliances in a competitive game in order to take down the leading player) [103, 104, 95].

### 2.2.1 Benefits of board games

The benefits of analog play have been addressed in prior works [95, 92, 99, 76]. Rogerson et al. [95] demonstrate four key aspects that players enjoy in analog play, the social experience, the materiality inherent from game components, the variety of choice between games and the intellectual challenge they impose.

The materiality of analog games is a fundamental aspect that differentiates the medium [95]. Players value game components and seek to personalize them by creating custom packages and incorporating additional thematic elements (e.g., replacing generic game tokens with painted miniatures) [95]. The game box is seen as that game's safe keeper, and packing the game correctly plays a significant role in the overall gaming experience [95]. Some players often engage with game components, even before the game starts, by manipulating them (e.g., organizing components and stacking them) [95, 99].

Physicality and bodily presence are also very important for players [95]. Non-verbal cues inherent to collocated play allow players to convey their intentions (e.g., looking at an action space for an extended duration may indicate a player's interest) [62, 97]. Players interact with each other either directly (e.g., moving pieces and changing the game state) or indirectly (e.g., by blocking

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<sup>2</sup>BoardGameGeek.<https://boardgamegeek.com>

actions of others), and often utilize the game as background for conversations [99, 95, 92].

## 2.3 Understanding Digital Games

Digital forms of play leverage technology to enable social interaction, allowing remote and collocated players to connect with friends, family and even strangers [40, 35, 36]. Most digital games have a strong emphasis around social interactions [35] and often foster shared experiences that allows players to spend time together [81].

Digital games have increasingly demonstrated to enable novel ways of interaction and customization, allowing players to modify the experience to fit their preferences [112]. Digital games are often categorized into genres, themes and social dimensions [41]. Some gaming platforms (e.g., Steam<sup>3</sup>) utilize different tags such as “Farming” and “Multiplayer” to describe a game.

Beyond the type of game, there is a variety of motivations as to why players play digital games, captured by Motivational Models, one of the largest ones being Quantic Foundry [118, 123]. Previous studies have categorized digital games in order to analyze and discuss them, in terms of their design approach, mechanics, aesthetics and forms of interactions [81, 41].

### 2.3.1 Benefits of digital games

Past research has investigated the benefits of digital games [35, 36]. Some studies have delved into how digital games can encourage physical activity [7, 57] and facilitate social interactions with non-familiar players through mutual nostalgic connections to games (e.g., talking about a game as a common interest) [35]. Other studies focus on how digital games can help meet social needs [35, 36].

While single-player games focus on developing individual skills [43, 114] some games require players to coordinate efforts towards a common goal [81] (e.g., in World of Warcraft [1], organizing a dungeon run requires dividing players into class groups for better results). Working together to complete challenges has shown to enhance the group’s bond [35]. Some studies suggest that the leadership skills developed in these contexts can carry over into real-life situations, such as motivating players to engage in voluntary activities more often (e.g., charity work) [15][35].

Digital multiplayer games often create scenarios where collaboration and communication are key to overcoming obstacles, such as difficult boss encounters [87]. Past studies have explored how asymmetric roles and independence can lead to an increase in social connectedness and communication [40, 21]. Playing single player games has also demonstrated to increase the feeling of relatedness with other players and encouraging social interactions in the physical world [114].

Customization in digital games has also shown to be a key motivation to player engagement, as it enables players to shape the in-game experience to their preferences [112]. Digital games often include ways that allow the player to customize elements that represent them in the game world, such as avatars, or skill trees [24, 112]

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<sup>3</sup>Steam. <https://store.steampowered.com>

## 2.4 Conceptualizing Hybrid Games

In previous works, hybridized play has been associated with transmediality (i.e. media that is connected across multiple mediums) [48, 63, 51], digitizing board game collections [94], enabling distanced board game play [62, 68], augmenting physical or digital experiences [25, 8, 50], but also hybridity of genre (e.g., combining European and American board game mechanics) [105]

### 2.4.1 Current approaches to hybridized play

Most hybrid games aim to blend analog and digital games [48, 5], but the definition of hybrid game is still not consensual within literature [79, 100]. Often, hybrid experiences consist of an analog game augmented with digital elements, or a digital game augmented with tangible or physical elements [48]. Some scholars [52, 37, 11, 90] describe hybrid games as augmented games, in which one element (analog or digital) augments the experience. Other studies [30, 45], suggest that added digital elements replace analog components, implying that the use of digital elements may improve analog experiences.

Rogerson et al. [100], argue these terms fall short in capturing the full potential of hybrid games, which instead should be seen as a form artifact that aggregates digital and analog components into a single compound media, mediated by human interaction.

**Digitization of board games.** Most modern board games exist in some form of digital adaptation [94]. During the COVID-19 pandemic, the digitization of board games quickly became a way to allow distanced friends to play board games [94]. Digitized board games have potential to merge the social benefits of board games with the efficiency of digital features (e.g., automation of tasks) [94], however, incorporating board games to digital mediums has revealed to be challenging, as it exposed friction points resulting from the lack of tangible and physical characteristics inherent to co-located board games, which are important to players [94, 99].

Some works highlight the benefits of digitized board games [82, 94, 99]. Rogerson et al. [94] emphasize that some developers enforce the most important aspect is translating the rules and ensuring the gameplay is consistent across mediums. Yet, digitized board games can lead to different gameplay experiences, and often apply modifications to original mechanics to better suit the digital format [94] — for example in the digitized version of *Agricola* by Chris Deotte [27], players must use cards as action spaces instead of drawing them to their hand. The digitized versions of board games can also extend their longevity — in past studies [47], players note the digital adaptation of a game can help sustain its popularity, even when the physical version fails to achieve widespread success.

Digital interfaces can present information in ways that enhance clarity and accessibility for players [94]. In some games, aesthetics are sacrificed for information display efficiency, catering to competitive players who prioritize mastering core mechanics and optimizing gameplay. For example, in *Puerto Rico Evolver* [69], information is displayed in Excel spreadsheet columns that are easily comparable, which allows players to streamline their strategies [94]. Experienced

players often utilize platforms that provide additional insights, such as the frequency of card usage and win rate, enabling them to refine their gameplay [94]. This focus on optimization drives players toward more competitive environments, leading to a rise in tournaments and promoting out-of-game learning sessions [94].

Prior works [119, 99, 94] have explored how automated tasks can be effective in removing the less engaging parts of board gaming, such as resource counting or game setup, while still maintaining player interactions. Some platforms, such as BoardGameArena<sup>4</sup>, opt to make most of the manual functions automated, while others such as Tabletopia<sup>5</sup>, allow users to manually move components and even add sounds that correspond to these actions (e.g., sound of a dice rolling), in order to immerse players and approximate to the physical experience. Player's cooperation in maintaining the game state is often obscured through digital implementations, which leads to a lack of player awareness and engagement [94]. Rogerson et al. [94] emphasize that digitized games should aim to balance player autonomy, highlighting that key tasks should remain manual to preserve engagement (e.g., restocking resources in the correct spaces after each round).

Digitized games often keep up with new content released for the analog version of the game, such as expansions [94]. Digital implementations can increase player immersion by creating more visually appealing elements and still remain true to the original artwork [94]. For example, in Playdeck's version of Agricola [86], card buildings are instead shown as actual buildings.

**Companion apps supporting analog play sessions.** Most hybrid games rely on some form of digital element enhancing the tangible experience [100]. The most common mechanism in modern hybrid games is the use of a companion app that offers functionalities that aim to enhance the immersion of the players into the experience, for example by providing thematic music, narration, or instructions [100]. In some games, these apps often generate randomized game setups and in-game events [100] (e.g., in the game XCOM The Board Game [53], the app can act as a game master, orchestrating the flow of the game by managing in-game events).

Some platforms use RFID tags embedded in components to maintain seamless transitions between mediums, allowing players to stay focused on the board while engaging with the app [31, 117, 5]. Teburu by Xplored [122] is a recent platform that facilitates digital-analog interactions across multiple boards by using these tags to capture pawn placement. Similarly, Tori [110] is a family-oriented hybrid platform designed to enhance social bonding and creativity through collaborative games, in which players must move a physical object that translates its movement into a digital app. SquareOne [121] also introduced their approach to bridge analog and digital games through an interactive table that is also able to recognize cards through RFID tags.

**Fabricated objects enhancing the experience.** Previous works explore how playful experiences and the fabrication of 3D components can enhance gameplay and act as a bridge between analog and digital play [8, 106, 108]. Emerging technologies like 3D printing, enable transform-

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<sup>4</sup>Board Game Arena. <https://en.boardgamearena.com>

<sup>5</sup>Tabletopia. <https://tabletopia.com>

ing immaterial products into tangible forms, preserving their connection to digital origins which can facilitate their integration into the digital medium [8]. Fabrication can enhance gameplay in dynamic ways, such as by expanding the board game experience, through generating new tiles, revealing hidden objects, printing new objects based on player input, creating trophies and mementos from achievements, supporting remote play and personalizing game pieces by applying printed stickers [8]. Fabricated objects also exist within the physical world, allowing them to be collected and accumulated across multiple play sessions [8]. Adding replayability can be a challenging task as components accumulate over play sessions [8]. One of the tradeoffs of 3D fabricated objects is the time they take to become materialized, however, Tanenbaum et al [108] highlight how this can be seen as a positive element in play, for example, by keeping players engaged and excited about what piece is being fabricated.

**Remote play of board games.** While hybrid digital board games have gained popularity, most are designed for co-located play and do not cater to the needs of remote players [105]. Some works explore how inherent aspects of board games such as sociality, materiality and player agency can transition to remote play [62, 68].

Current approaches of hybrid games that facilitate remote tangible play systems face several challenges, including maintaining player awareness, incorporating physicality, and synchronizing the game state across different households [94, 62, 68]. A common issue for players transitioning from co-located to remote play is the loss of face-to-face interaction, which many see as a key drawback [68]. Some platforms such as the aforementioned Teburu [122], can enable remote play between several game boards, as the position of components in the game board can be captured digitally, and generate dynamic interactions in an app.

Research [62, 68] has proposed theoretical frameworks to adapt board games to remote play emphasizing factors such as physicality and player agency. Some works aim to enhance the tangible gameplay experience by adapting elements from co-located analog play such as bodily presence to remote settings [68].

Other research views distanced play as an opportunity for innovative and meaningful game design [105, 100]. Rogerson et al.[100] present the Distanced Hybrid Play Experience framework, which reflects the challenges and opportunities found in distanced play. This framework includes some considerations that are meant to emphasize the understanding of distance, not only as an obstacle to enjoying board games but an inspiration for meaningful design choices [100].

Interactive tabletops have also shown to allow bridging board games to distanced play, fostering social connectedness through collaborative tasks like shared drawing [56]. TableTeleporter [78] and PlayTogether [120] are systems that integrate video capture while also projecting other players' components onto a screen and allow interaction with physical pieces.

Although not applied to remote play, the STARS project [79], is an interactive table which is able to capture information such as player positions in the game board and implement other digital features such as room speakers and private devices to enhance board game immersion.

**Augmented reality in board games.** Some works [60, 37, 11] explore hybrid game experiences through playing a board game using augmented reality. Augmented reality technologies have shown to be able to make analog games immersive, by adding digital features such as atmospheric audio [60], while representing the game state through a visual display [79]. CheckMate [37] is an augmented-reality system that highlights how pieces can cue players for the next possible actions, while simultaneously viewing a digital representation of their remote opponent's pieces through a head-mounted display.

Another approach to augmenting board games is demonstrated by Molla et al. [70], where dice in Monopoly [22] are displayed through a head-mounted display. Buruk et al. [11], also explore how augmented wearables such as gloves that capture player movement can be translated to game actions in order to increase player engagement.

**Pervasive games.** Previous research has further expanded the hybrid game umbrella to include pervasive games in which real-world data generates digital interactions (e.g., location, steps walked..), [79, 113]. Björk et al. [9] have explored the concept of using the physical world as a game board, in which players are pawns and their location can trigger in-game events such as battle encounters with other players. This approach draws inspiration from live-action role-playing games, in which players also share a fictional world and act in character, depending on the theme of the game [115] [9].

Several well-known games, such as Invizimals [77] and EyePet [107], incorporate physical tangible interaction components that enhance digital gameplay [117] (e.g., camera to capture movement). More recently, games such as Pokemon Go [72] and Pikmin Bloom [73] have been designed to encourage physical activity, by using movement (e.g., kilometers walked) as a form of in-game currency and allow actions in the game, such as leveling up and collecting items [4].

**Toys and figures in digital gaming.** For the past years, hybrid products have seen a trend increase [117], with some companies such as Hasbro and Lego investing in hybrid products [23]. Previous research [117] shows how the inherent materiality of toys can be used in combination with digital features to create engaging experiences by carrying information that links to a digital game. Tyni et al. [117] capture and compare different degrees of hybridity, such as interdependence and synchronicity between digital and material elements, into the “Dimensions of the toy experience framework”. Some toys, such as HappiTaps [44] and YetYet [20], utilize a smartphone to represent the face of an animal, and provide a synchronous experience, as users hold the toy while interacting with the digital device [117]. Similarly, Labo [75] enhances interaction by embedding a smartphone into physical objects, creating a more immersive experience (e.g., placing a smartphone into a wooden fishing rod to play a fishing game within an app). Other hybrid products such as Skylanders [10], provide an asynchronous play experience, as players link a physical character to the digital game before using a controller for further digital interaction.

Some companies such as Nintendo and Activision, have leveraged hybrid models to create payment systems that require players to buy character figures in order to unlock them in the digital

game. Games such as Skylanders [10] and Amiibo [74] convert physical character figures into digital assets and add content such as new scenarios to gameplay based on that character figure.

### 2.4.2 Benefits of Hybrid games

Hybridized play can act as a unique experience that can bridge analog and digital play, and present new opportunities in game design offering experiences that neither digital or analog games can achieve independently [105, 100]. The benefits of hybrid games have been explored through frameworks and design guidelines which aim to enhance the qualities of each medium in the play experience [49, 100].

- **Mediator Between Values.** Hybrid games allow players to interact with both the analog and digital medium, combining the strengths of each to create a unique experience (e.g., combining the social engagement from board games with dynamic interactions from personal devices) [100]
- **Sociality.** Hybrid games allow social elements from both mediums to co-exist, such as the awareness of others through bodily presence in board game play and allow for digital interaction through one or multiple personal digital devices [100].
- **Enabling Remote Play.** While less explored, hybrid games have potential to enable remote board game play [89, 105]. Some works [100, 62], focus on how verbal and non-verbal communication and tangibility can transfer to the digital medium.
- **Replayability.** Some works [94, 99], explore how digital tools can be used to increase the replayability and scalability of board games, for example, by providing regular updates and adding new content such as expansions.
- **Added Value.** The digital element can also be used to add value to the board game by expanding the game with new features [94] (e.g., pre-recorded commands to guide players through the experience), or act as a bridge to more competitive environments (e.g., providing statistics about strategies).
- **Accessibility.** Hybrid games can offer a variety of solutions to make gaming experiences more accessible [47, 47]. For example, by adding a digital layer to analog games that enables auditory feedback (e.g., by reading a card), to make the experience accessible to visually-impaired players. The digital medium can also ease learning by acting as a tutorial, through videos that explain game rules or providing cues for possible next actions [100].
- **Customizability.** Customizable experiences have shown to be an important part of gaming for analog and digital players [95, 112], in hybrid games, the digital element can add the possibility for players to add new content to the board game [94]. Some Campaign series

board games such as Clank! Legacy: Acquisitions Incorporated [3] already make use of customization elements to enable subsequent sessions to follow up previous sessions, making each board game unique as not all gaming groups will follow the same path.

### 2.4.3 Designing Hybrid Games and Challenges

Despite the promising avenues for hybrid games, most fall short in creating meaningful interactions between game elements, leading players to prefer a full analog or digital experience [31, 99, 100]. Research has addressed these challenges by trying to understand what players find positive in a hybrid experience, and how both mediums can enrich the experience. Previous works have highlighted how players express interest in interacting with the digital medium under suitable conditions such as when it is discreetly embedded, is intuitive to use and allows for greater customization [31].

Some works emphasize that hybrid experiences should be designed to engage with multiple senses [47], and can thrive when analog and digital elements function independently, with some interlinked elements through asynchronous interactions as explored by Tyni et al. [117]. Past research has also developed an understanding of design guidelines to enhance usability in digital and analog game experiences through heuristics [32][28], however these have not been explored in hybrid game design contexts. Some approaches utilize Ideation decks as a strategy to facilitate brainstorming sessions that aim to develop newer interactions between the analog and digital medium (e.g., interactions for remote board game play) [58, 83, 98]

More recently, Farkas et al. [31] have explored how board game players envision interacting with technology during gameplay, applying concepts from the field of the “Internet of Things” [59] to hybrid game interactions. In this approach, game components are understood for their potential to connect with others within the same network. Their research further introduced a taxonomy that characterizes interactions between the analog and digital mediums as a sequence of Input, Processing, and Output [31].

Although it is certain that some games might provide more promising interactions than others, hybrid game design is a field that has not yet been fully explored, and there remains significant potential for innovation in creating meaningful player experiences that seamlessly integrate analog and digital elements [105, 100].

### 2.4.4 Transmediality expanding the experience

Previous works have investigated how integrating tangible and digital elements can extend player engagement by bridging different mediums [51]. Players value the ability to collect and own tangible products associated with their favorite franchises [117], some games such as Angry Birds [102], have shown that game universes can transfer between mediums as players who played the digital game were more perceptive to buying related merchandise, such as plush toys which also enabled a larger trend [117].

Digital games are increasingly converted and published as hobby board games (e.g. Slay the

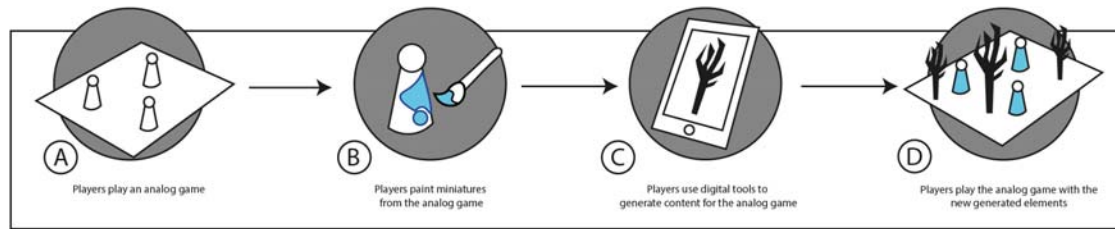


Figure 2.1: Example of how players may interconnect game related activities

spire [64], *Stardew Valley* [18], *Sniper Elite* [91]). Research [47, 13, 42, 55] has also investigated how separate but interlinked activities can appeal to a sense of continuity in the experience (Figure 2.1), increasing player engagement and immersion. Kankainen [47] further explores the concept of “**geography of play**” [55], in which play activities surround the core of a game, while other activities may emerge forming the periphery of gameplay (e.g., painting miniatures from the board game). In play experiences, the role of digital and analog elements may intersect, and create a notion of shared interlinked activities [[47]. Players recur to the digitized version of the game to optimize strategies between play sessions [94, 99].

Continuity can also emerge from long-term game practice [47]. In some games, such as *Blood Bowl* [46] (i.e in this game players participate in a series of matches over a certain period of time), continuity emerges through players team development, allowing for strategic planning across matches which for some players extended over years.

In analog role-playing games, such as *Dungeons and Dragons* [33], a player appointed as the game master often generates content between play sessions, which helps sustain player engagement [116]. For many analog players, digital platforms help preserve continuity by maintaining game records and statistics [47]. Kankainen [47] also highlights the potential of adding in between sessions elements such as metagames that are somehow connected to the analog or digital game, to further enrich the experience.

Research [47, 13, 42] has recognized continuous experiences as having potential to enhance player engagement and immersion.

Some works already outline Continuity as a design goal (e.g., by enabling player decisions to have consequences in future game sessions) [106], and identify that embracing continuous play may enrich the experience. However, it is not yet completely understood what elements between analog and digital game sessions give players the sense of continuity, and how these could impact their play experience.

## 2.5 Summary

As previously mentioned, each medium has its unique characteristics and may support different needs [36, 35, 100, 94]. Board games leverage the tangibility of components to create engaging experiences and foster social bonding through spontaneous interactions between players [99, 95].

Digital games can offer more accessible environments by enabling remote play and delivering immersive experiences through auditory and visual elements [35, 36].

Hybrid play has been recognized as a bridge between analog and digital gaming, with the potential to combine the strengths of both mediums and create a more engaging experience [105, 100, 79, 49]. Current research on hybrid play addresses player needs by enabling remote play of board games, automating "boring" tasks (e.g., scoring), and enhancing engagement through elements like customized fabricated components [94, 119, 8, 108].

Despite this, hybrid games often face challenges such as diminished player agency and immersion, with many players preferring fully analog or digital games due to disruptions in game flow caused by either the analog or digital medium [79, 119, 105, 100, 94, 99].

Previous studies highlight how analog and digital forms of play can create a sense of continuity, enabling players to choose between the two formats to engage with the experience [47, 106, 49, 66].

However, to the best of our knowledge, no game experiences currently offer a seamless transition between analog and digital play sessions. We anticipate that further exploring this concept could potentially unveil other benefits, such as fostering deeper connections among a group and allow for greater flexibility when engaging with the experience (e.g., allow some players to play digitally while others play analogically).



## Chapter 3

# Exploring Continuity in Games: Analog, Digital and across Mediums

In this chapter, we explored how players perceive a sense of continuity when playing a game over multiple sessions. Past work suggests there are benefits in this sense of continuous play (e.g., long-term engagement) [47]. Yet, this aspect of the player experience is still not fully captured in research—it is not completely known what elements contribute to this sense or what trade-offs it can have in players’ experiences. Importantly, while digital and analog gaming mediums share similarities, they offer distinct advantages due to their different modalities of play [95, 119, 94]. As such, we took a step towards understanding how a sense of continuous play differs—or aligns—in the digital and analog medium and specific considerations that emerge relevant in these settings. Additionally, building on previous works [47, 117, 51, 63] and as a prequel to broader research, we explored how a sense of continuity can be achieved in a *transmedial play* scenario [63, 109]—a term we will use throughout this chapter to define an experience where players can engage with a game through either analog and digital means, while still feeling as though they are continuing the same play experience. We aimed to answer the following research questions (RQ):

- **RQ1:** What makes players feel continuity between gaming sessions, and what are its trade-offs?
- **RQ2:** How can continuous gaming experiences be achieved in a transmedial play setting?

Based on individual interviews with 12 participants, our findings suggest that players value games that can create a sense of continuous play—continuity allows players to form a deeper connection with the game, especially when they shape the game world across multiple sessions. When the experience is shared with other players, it can create some sense of ownership, as players feel like they are shaping a path together in the game world. We identified trade-offs specific to each medium, such as the difficulty of saving progress in analog games and perceiving continuity through asynchronous contributions in digital games. Further, participants welcomed continuity in transmedial settings, emphasizing the increased flexibility and immersion when offering multiple ways to engage and progress in a single continuous experience.

### 3.1 Method

We conducted a user study with 12 participants in order to understand how the sense of continuity can affect the player experience, what elements in a game can contribute to this feeling and what may break it, as well as the tradeoffs associated. We also invited participants to think about how continuity could be achieved in transmedial play, and the challenges that could be involved in such an experience.

Participant	Gender	Age	DF	AF
P1 (R)	M	31	Weekly	Monthly
P2 (R)	F	34	Monthly	Weekly
P3 (R)	M	42	Weekly	Monthly
P4 (R)	M	45	Monthly	Weekly
P5 (R)	M	37	Monthly	Monthly
P6 (R)	M	24	Daily	Monthly
P7 (P)	M	26	Weekly	Monthly
P8 (R)	M	40	Daily	Weekly
P9 (R)	M	29	Daily	Monthly
P10 (P)	M	23	Daily	Monthly
P11 (P)	F	24	Monthly	Monthly
P12 (R)	F	24	Weekly	Monthly

Table 3.1: Details of the participants, interviewed either remotely (R) or in-person (P), including gender, age, digital gaming frequency (DF) and analog gaming frequency (AF).

#### 3.1.1 Participants

We recruited 12 participants (9M, 3F), aged 23-45 ( $M=31.6$ ,  $SD=7.9$ ) [Table 5.1]. Recruitment was done through open calls shared in gaming communities (e.g., Telegram groups) and through word of mouth. The interviews averaged 40 minutes and were done remotely ( $n=9$ ) or in-person ( $n=3$ ) at our university.

#### 3.1.2 Data Collection and Analysis

We adopted the codebook thematic analysis approach outlined by Braun and Clarke [17]. As we had pre-established research questions, the process began with generating codes deductively, informed by those questions (e.g., Benefits of continuity). The interview's audio recordings were transcribed, and subsequently read and reread to allow for data familiarization. We then started inductively generating new codes. Two researchers were involved in this process, first coding a set of three interviews independently and then meeting to discuss their initial codes. We then refined these codes throughout multiple meetings adding, merging and removing codes as needed. Then, one researcher used the final codebook (in Appendix A) to code all transcripts. Following this, we identified and refined themes based on recurring patterns in the data. We had a final meeting with the whole team to discuss, refine and name these themes.

## 3.2 Findings

We now present the themes, supported by participant quotes, highlighting key differences in continuity between *analog* and *digital* play settings. We also explore participants' speculative insights for continuous *transmedial* play scenarios.

### 3.2.1 Continuity as in-game progression

For all participants, continuity emerges with some kind of progression over sessions, which might occur in terms of narrative but also in the ways the gameplay, the world and their character evolve. Progression happens as players unlock features such as new abilities or levels with unique challenges. *Digital* role-playing games were repeatedly mentioned by participants as good examples of this: “*You are playing the game and essentially you are building, let’s say, your character [...] that’s what creates the sense of continuity*” (P6). In *analog* games (especially in legacy board games), progression happens as players gain access to new physical components (e.g., boxes that include new cards and pieces) or alter existing ones to represent these changes (e.g., by applying stickers to the rulebook or cards). Challenges and quests that extended across multiple sessions were particularly considered to support continuous play: “[*In Stardew Valley*], to complete a quest, you have to play multiple sessions to, for example, collect the required items [...] Every time I start the game, the first thing I think is like ‘what was I doing?’” (P2).

In line with this, participants suggested that in a *transmedial* game, both mediums should progress in some interconnected way. Some saw benefits in having a way to continue the exact same gameplay across mediums: “*Take a photo or something [...] and I can continue the game digitally using the board game’s rules*” (P4). Others favored different gameplay in each medium, with one unlocking content for the other (e.g., achieving something digitally unlocks new cards for analog sessions) or advancing the narrative in different ways, P9 illustrated this with an example: “*For example, in Code Lyoko [an animated series], in the analog session you could play in the school setting and in the digital you could be fighting XANA*” (P9).

### Losing progress and breaks in continuity

Expectedly, losing progress in a game (e.g., server wipes in digital games) was associated with breaking the sense of continuity. Yet, as explained by participants, even when part of the progress is lost, a sense of continuity can remain. For example, P1 described how in the board game Oath the progress is reset but one session influences the next by adding new cards or switching player roles. Similarly, P9 noted that in the roguelike digital game Hades, while abilities and difficulty reset with each run, the narrative evolves, which maintains a sense of continuity. Conversely, progression elements may not always make an experience feel continuous. P4 explained that while digital racing games unlock new cars after races, this feels secondary, noting that “*the psychological effect of continuity isn’t important in that type of game*” (P4).

Further, while discovering new content was an exciting aspect of continuous play for most

participants, some mentioned that once this novelty ends, it can lead to a diminished sense of continuity, as gameplay may become too monotonous: *“It goes on for so long, and the game doesn’t motivate you to play further or introduce new things... It starts being too repetitive”* (P11). This may also happen and be especially frustrating when players reach a *“roadblock”* (P6) with their decisions resulting in irreversible changes to gameplay or prevent them from completing a level or scenario.

In that regard, P11 highlighted a positive feature of *digital* games, noting that players can create new saves to refresh their experience and explore parallel continuous progress within the same game.

Some participants noted that breaks in the sense of continuity may not be completely negative, as they can be purposefully done to offer players choices in progression (e.g., market phase to buy upgraded weapons) or introduce a new perspective of the narrative: *“The narrative is converging from the original point [...] if it happens for me it’s fulfilling”* (P7).

### 3.2.2 Embarking on a journey: Connection with the game and others

Participants pointed out that in some games (particularly *digital* games), continuity may emerge from a predefined narrative, while in others, players have greater freedom to choose their own goals and path, with their actions directly influencing the game’s outcome: *“Games where we have an open world... I end up creating my own continuity in the game”* (P1). Some participants shared that a dynamic world that is continuously shaped by their interactions makes the journey feel personal and unique, especially when they can share this journey with other players: *“Having this journey in the game and with people [...] It’s almost like the feeling of walking a trail together with some friends”* (P5). When playing with others, many noted that the sense of continuity became associated not only with the game itself but also with the players who shared the experience: *“It feels like you are interacting with friends, and feeling that we are progressing together, or experiencing the game together. In the end, we’re creating memories together”* (P6).

Participants expressed a sense of achievement when they can see the impact of their actions from past sessions, such as when seeing their buildings in a *digital* world or stickers in an map that show they completed that scenario in an analog game: *“Sometimes its motivational that feeling of accomplishment [...] the feeling that you are progressing somewhere”* (P6). Anticipating the next session was also a common topic between participants, and was highlighted as one important aspect of continuity: *“For me it’s one of the most important aspects of continuity between sessions [...] the pleasure of discovery [...] the excitement and the anticipation of it”* (P3). Participants associated this feeling with their disengagement process, as ending a session on a cliffhanger may motivate them to anticipate the next game sessions and leave players reflecting on the game.

Participants mentioned how *transmedial* play could enrich the journey of a continuous experience, by allowing them to explore different *“scenarios and new realities inside the game”* (P8), while leveraging the best of each medium: *“There are parts in gameplay which would be more fun if done digitally [...] if he wanted something more relaxing, looking closely at the board [...]*

*he would play those parts of the game in analog*” (P4). One participant highlighted how each medium could retroactively remind players of moments from previous sessions: *”Explicit events in the analog could be referenced in the digital”* (P7).

### 3.2.3 The role of self in continuity: Mastery and social dynamics

Participants also mentioned how acquiring knowledge and mastering a certain game across multiple sessions also contribute to a sense of continuity: *”We reflect on strategies other players followed or what leaders or characters [...] and generally that experience of knowing the impact of certain characters in the game [...] is what gives me continuity. Understanding its impact gives me a sense of continuity”* (P2). P6 highlighted that, even when in-game progression is lost, players’ skill and knowledge are always carried over to the next session.

Some participants noted that playing with a consistent group of friends fostered inside jokes, unique dynamics, and predictable behavior patterns, creating a meta around the game that translated into continuity: *”The meta you create around the game, the jokes... make these experiences much more interesting”* (P3). A shared improvement in the game through multiple sessions also allows players to discuss high level strategies and theorycraft: *”You are playing with someone who knows the rules and has played the game before [...] being able to talk about it helps a lot in feeling continuity”* (P2). Participants suggested that, in *transmedial* play, the digital part could aggregate information from both the digital and analog sessions to present insights to players, enabling them to reflect on and *”digest”* (P2) what occurred during gameplay.

Many participants noted that restarting the game at an easier difficulty to accommodate new players disrupts the sense of continuity. Some also mentioned that when a player’s expertise lags behind, it can break continuity, as they may feel uncomfortable discussing strategies or struggle to progress at the same pace as before. Players who progress more slowly in a continuous experience may encounter unfamiliar game elements unlocked by others with greater expertise, making them feel disconnected: *”It seems like those things are not mine [...] It’s like ’look, now we’re at level 100, now you have level 100 equipment”* (P11). Participants emphasized that in *transmedial* play, group progression should be balanced to prevent such discrepancies, as players may want to continue individually (e.g., in digital form) while preserving the integrity of group progression.

### 3.2.4 The burden of commitment: Fatigue and availability

Despite the recognized benefits, participants identified drawbacks mostly related to commitment and availability. P1 emphasized that in some digital games, players may feel like they are missing something when not playing: *”The disadvantage is almost like... the fear of missing out in that we almost feel like we need to be constantly connected”* (P1). Also, continuous gaming experiences may take a very long time to complete, leading them to choose and try other games: *”Beyond the dedication you need to put in these games... They require a lot of time to complete... You end up choosing other games to play”* (P3). Specifically for *analog* gaming, a participant mentioned that, to finish long games, he has to maintain the components set up in a dedicated space, which

is burdensome: “*I play war games which take 50, 60... 70 hours to play... The game has to stay in place somewhere while its not completed*” (P4). This sense of continuity for players often translates into a game that is felt has not been completed and this sense of the need to *finishing it* can have negative impacts on the willingness to play and the satisfaction of each play session.

For some participants, finding time to regularly play digital and analog games—especially the same game with the same group across multiple sessions—can be challenging, which exacerbates the issue. P3 highlighted that, if for some reason (e.g., unavailability) the game ends up being unfinished, he would feel like he “*wasted [his] time*”. Some participants highlighted the benefit of *transmedial* play in offering greater flexibility, as it could allow players to follow more convenient schedules through digital play and still provide the opportunity to meet in person: “*It’s easier for people to play together... Because we can play in analog when we are together and in the digital when we cannot meet*” (P11). This flexibility was especially appreciated by P12, who has distant family and friends and enjoys playing board games with them during their visits.

### 3.2.5 Lost in transition: Challenges of resuming play

In most *digital* games, progress is saved automatically, but in *analog* games, maintaining continuity can be more challenging. P1 noted that some *analog* games include features, such as containers for holding components, to help preserve the game state. However, this is not the case for all games, which can lead to negative outcomes: “*I setup the game in a table, and it stayed there for weeks... So after a year of not playing I sold it*” (P8). Most participants expressed that if too much time passed between game sessions, they would forget the rules, story, and even strategies from the previous session, which could disrupt continuity: “*Continuity is like reading a book in which if you pause for a long time you either have to start reading from the beginning or move on to another book*” (P4). Many participants mentioned that the main reason for a large gap between game sessions was “*the need to coordinate players’ schedules*” (P3).

Some games provide a way to help players recall previous sessions. P7 mentioned that in the analog role-playing game Dungeons and Dragons, the game master typically “*provides a brief recap at the start of each session to ensure all players are on the same page*”. Similarly, P4 mentioned that in longer *analog* games players usually rely on taking a picture or leaving physical clues (e.g., writing notes) to remember where they left off during the gameplay. P10 suggested that *digital* games could benefit from a recap feature for players who have not played in a while, helping them to “*refresh their memory*”: “*I wish digital games had this kind of feature that could remind you of what you were doing and to catch you up... If you spend a long time without playing...*” (P10).

Some *digital* games offer the possibility for players to progress and contribute asynchronously to the gameplay (e.g., open servers, digital versions of board games). In these, it might happen that the game progresses without the player, causing returning players to feel confused or out of place. Some participants noted that this may also happen in a *transmedial* setting, where the experience can progress in analog or digital sessions, without all players necessarily being present.

P10 suggested that to prevent this, the transmedial game experience could include an app to notify players about ongoing events: *“I think everyone that was playing the game should have an app which informs you about what is going on”* (P10).

### 3.2.6 Keeping the flow: Continuity out of session

Some participants also mentioned activities that enabled the sense of continuity outside of the game. P5 stated how logging their *analog* game sessions in an app and looking back at that history of games felt like continuity: *“You can log the result of the game and look at it and see this player won x games..., and see stats from a specific player and game”* (P5). P10 noted that in *digital* games, it is common for players to engage in character building outside of gameplay (e.g., by researching strategies to enhance their character’s strength): *“I usually always check what people say about a certain build... To get a second opinion about my build”* (P10). Continuity may also emerge from engaging with other players outside of the game, as they remember and talk about each other’s experience with the game: *“I create this narrative... And then I also talk about it with other people that played the same game”* (P2).

## 3.3 Discussion and Conclusion

In this section, we discuss the elements that contribute to a sense of continuity mentioned by participants in analog and digital play, its trade-offs in the player experience (RQ1), and considerations for transmedial play continuity (RQ2).

### 3.3.1 Elements of continuity, tradeoffs and opportunities

All participants referred to **progression** to be a key element to the sense of continuity, whether building up the **narrative, world, or characters** over multiple sessions. Moreover, time-demanding goals (which span multiple sessions) and indicators of progress (e.g., a level map) were seen as an important vehicle for continuity, especially when starting a new session after some time, and in providing players with a sense of accomplishment. Our findings suggest that continuity associated with in-game progression in both digital and analog games fosters a **strong connection with the game and between players**, especially when progression is shaped by the players (e.g., allowing players to build in the world, narrative choices). These findings align with previous work that emphasize how players can get emotionally attached to a game, and even mourn after the death of a character [106, 63].

Continuity arises not only when progress is carried over between sessions but also when **visible changes are introduced in the next session** (e.g., the winner gains new abilities for the following session). In analog games, these changes usually come in the form of permanent changes applied to the components (e.g., scratching, stickers). Previous studies [12, 101] have investigated the effects of persistent consequences in gameplay, highlighting how these can positively impact the player experience by fostering a stronger emotional connection to the game. In contrast, some

participants expressed frustration with reaching irreversible points in gameplay (e.g., not being able to revert a decision or explore a part of the story) leading to a diminished desire to continue playing.

Participants also noted that continuity does not have to be built into the game's design. This sense may also emerge in how players perceive their **skill improving** and in how a **group develops memories together**. Our work suggests this type of continuity can even extend across different games, particularly those with similar playstyles or belonging to the same franchise [47]. Future research could investigate how games might better capture and celebrate key achievements and shared moments, creating opportunities for players to revisit and relive continuous experiences together.

Playing with the same group supports continuity, but **challenges in coordinating schedules** often led to frustration and abandonment of the game. While playing digital games asynchronously may alleviate this, participants noted how it may lead to some players feeling excluded if others have significantly more time to play. In analog play, addressing this challenge is more complex since players must typically be physically present to play together. Future work could explore incorporating asynchronous interactions in analog games while preserving the sense of continuity between player moves (e.g., including a companion app that tracks the game process and in which players could make their move digitally, with the app providing context to the other player).

Another drawback of continuous play identified is the **challenge of resuming a game after an extended break**. Participants noted that a recap feature of previous sessions could help address this issue. For example, an analog game could include a digital narrator that summarizes key events, player decisions, and current objectives. Moreover, the way players choose to disengage with the game may affect their perception of the current session, anticipation of the next one, and thus their sense of continuity. Previous work [2] offers insights into how disengagement could be reframed as a positive aspect of the player experience. This has led us to explore breaks in continuity as a motivator for players, such as by introducing new characters in one medium that only appear in later sessions.

### 3.3.2 Considerations for continuous transmedial gaming

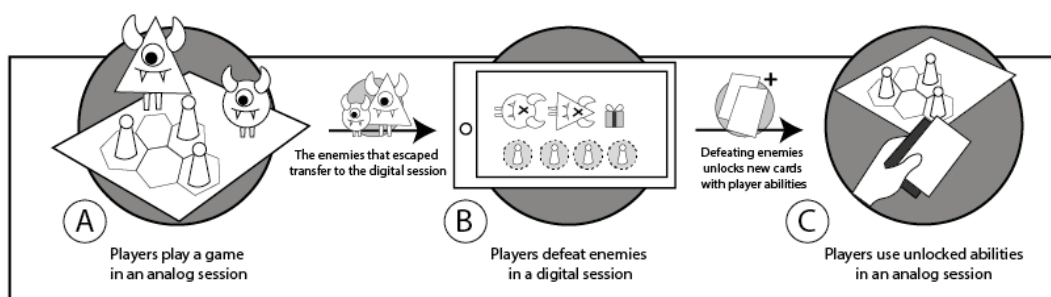


Figure 3.1: Sequence of gameplay across analog and digital sessions.

Participants saw value in designing continuous play across analog and digital sessions. First,

the approach was seen as a way to **increase flexibility** in how players progress in the game, allowing them to seamlessly continue play while preserving progress (e.g., by taking a picture and uploading to a digital app like Board Game Arena). Second, other perspectives noted that distinct gameplay experiences across mediums could **enhance immersion** and complement each other, for example, by delving deeper into specific parts of the story. Participants recommended designing each medium to explore different aspects of the same game, leveraging the strengths of each format (e.g., digital sessions to explore action-centered combat and analog to emphasize strategic planning and social interaction). Participants suggested that having one medium influencing or unlocking content in the other would foster a sense of continuity (Figure 3.1). Yet, participants cautioned that this should not result in medium dependency, where progression in one medium becomes a prerequisite for engaging with the other.

Transmedial play was discussed as a potential solution to address some drawbacks of continuous gaming experiences, such as the challenges of commitment and coordinating schedules with all players. This approach could allow individuals to engage with an analog game through digital means even when others are unavailable, preserving their personal sense of continuity. However, it also introduces the challenge of **avoiding discrepancies in group progression**. To mitigate this, transmedial play should prioritize clear, shared indicators of progress across mediums and include mechanisms like notifications to keep players aligned.

To maintain a cohesive game experience and preserve the sense of continuity between mediums, certain elements, such as the game world or characters, should remain consistent across sessions. However, participants also noted that breaking continuity is not always a negative factor in the experience, as when done thoughtfully, it can lead to more fulfilling experiences. Future work could explore how balancing breaks in continuity between mediums could provide a more meaningful bond between game sessions while still not disrupting the overall experience.

Previous work has recognized that most analog game players often prefer the game to be fully analog and end up disliking the added digital element which plays a supporting role in the experience (e.g., reveal secret information) [100, 99, 31]. In the next steps, we explored this concept in practice, by developing a prototype which extends an already existing board game, and using it as support to a user study in order to assess how players react and perceive this experience.



## Chapter 4

# Design for Continuous Transmedial Play and Implementation

The next step in our work was to operationalize the findings from the first study in order to further explore players' perspectives on continuous transmedial play. Previous research has highlighted the importance of designing hybrid play experiences that are meaningful and cohesive rather than merely technological “gimmicks” [99]. Drawing on these insights, we sought to maximize the benefits of transmedial continuity by designing and developing a digital component that could extend the analog game experience. Digital sessions were designed to enable players to progress (e.g., buying additional cards to their decks ) and feel engaging by connecting the narrative and game world to previous sessions and creating elements which transition between session (e.g., new cards and items).

In the following sections, we begin by describing the procedure that guided the choice of the board game, followed by a brief description of the board game. Next, we detail the design of the digital prototype and provide a description of how the elements of continuity were implemented in the play experience as well as component transitions between the analog and digital mediums.

### 4.1 The Board Game

We started by looking at campaign games (e.g., games with multiple chapters) with moderate complexity (3-4/5) in BGG<sup>1</sup>, as it better represents the kind of games present in the hobby. Through these discussions, we progressively refined both the structure of the upcoming study and the prototype to be developed. One of the first decisions concerned whether to design a new board game from scratch or adapt an existing one to have a digital extension. Given the time constraints to develop the prototype, and the team's limited experience in developing board games, we concluded that building upon an existing design was the best option. This decision allowed us to focus on designing connections between physical and digital play, rather than creating and balancing a new game. This process was done through over a month of regular team meetings.

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<sup>1</sup>Board Game Geek. <https://boardgamegeek.com/>

### 4.1.1 Choosing the Board Game

To ensure quality, we decided to narrow our search on highly rated titles listed on BGG<sup>2</sup>. Our discussions then turned to identifying what kind of game could best represent the key elements of continuity identified in our earlier work [34] and how these could be carried across physical and digital sessions (e.g., from the board game to the prototype and back to the board game). At the same time, we were mindful of the challenges also highlighted in our first study regarding continuous transmedial play, such as balancing progression across platforms, while still leveraging the strengths of each medium (e.g., the flexibility of the digital medium).

Based on this criteria, we searched for board games structured around distinct phases or chapters, particularly those that include a “shopping” or “upgrade” phase where players spend resources to enhance their characters (e.g., purchase new cards). We envisioned adapting one of these phases to the digital medium to minimize breaks in gameflow or progression—for instance, creating a digital extension where players could use rewards obtained during the physical session to upgrade their characters before the next physical session.

From the top-ranked titles on BGG<sup>3</sup> and those to which we had more convenient access, we selected **Tidal Blades 2: Rise of the Unfolders**<sup>4</sup>. The game’s relatively short session length (45 minutes per player) made it more suitable for user study sessions, while still offering opportunities to explore continuity between physical and digital play sessions.

### 4.1.2 Description

Tidal Blades 2: Rise of the Unfolders is a cooperative, chapter-based board game in which 1–4 players travel to the Fold and defeat threats. Each chapter represents a chapter composed of combat and objectives, which sometimes is followed by an Interlude phase where players can upgrade their characters (e.g., purchasing new cards or items), and deepen their understanding of the game universe through Encounters (i.e. card with two narrative options that gives players additional lore and rewards (depending on what option the players chose)). Next, we give a brief description of the board game components and how they are used in the game, followed by a brief description of the gameplay rules from both Adventure and Interlude Chapters.

#### Components

- **Cards.**

1. **Action Cards.** Cards with different abilities that players use in combat.
2. **Power Cards.** Cards with a *Persistent Power* that is always active and acts as a passive during a player’s turn.

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<sup>2</sup>Board Game Geek. <https://boardgamegeek.com/>

<sup>3</sup>Board Game Geek. <https://boardgamegeek.com/>

<sup>4</sup>Tidal Blades 2: Rise of the Unfolders. <https://boardgamegeek.com/boardgame/233261/tidal-blades-2-rise-of-the-unfolders>

3. **Battle Scar Card and Wounds.** Players receive Wounds whenever they reach a certain Resilience threshold in combat and must mark them in their Character Sheet (whenever players reach 5 wounds, they add a Battle Scar Card to their deck that weakens them).
  4. **Encounter Card** A card presenting two narrative options, from which players must choose one and receiving rewards based on that choice.
  5. **Enemy Card** Card that states how much an enemy will move and his attack power.
- **Player Grid.** Players place cards in the Nexus grid and can activate the line or column from where they placed the card to perform actions.



Figure 4.1: Card anatomy on the left, followed by the Player Grid

- **Items.** Augment the hero's abilities and can be placed on cards in the Nexus grid.



Figure 4.2: Item anatomy

- **Traits.** Players manage several resources to power actions and abilities:
  1. **Spirit** for movement,
  2. **Focus** to boost attacks,
  3. **Shells** for defense and action skills related to the **Quantum Reservoir**(Synergy),
  4. **Resilience** Player's health track

5. **Fruit** for healing, reviving, or buying/recharging items.
- **XP.** Experience points earned through chapter completion and are used to purchase Action Cards or upgrade traits.
  - **Fame.** Fame milestones grant additional XP, Fruits, or Path Advancement rewards (e.g., being able to purchase higher tier cards).
  - **Goal Card.** Goals Cards are received in the second chapter and define personal goals for players.



Figure 4.3: Player Goal card

- **Character Sheet.** Tracks the player's progress rewards earned, and resources collected while showing upcoming goals and achievements.

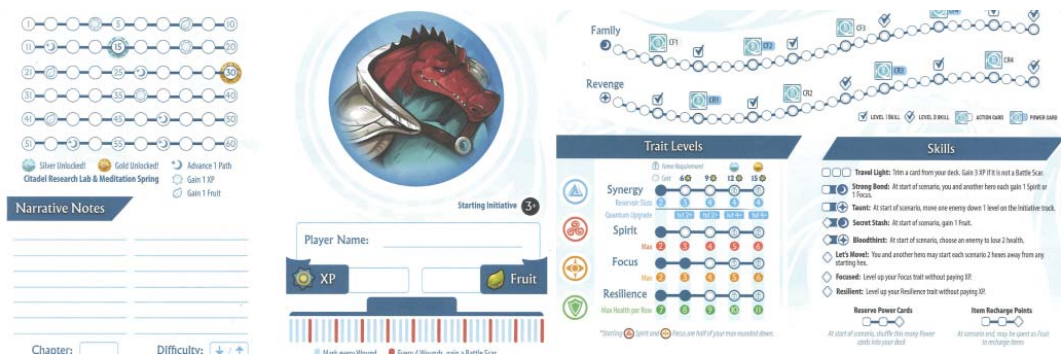


Figure 4.4: Character Sheet

### 4.1.3 Gameplay in Adventure Chapters

During an Adventure Chapter, the shared play area is represented by a hexagonal grid. Players place their hero miniatures, enemy figures, and other tokens tied to the chapter's objectives (e.g., Resources positioned across the map or interactive tokens to advance to the next part of the chapter) in hexagons. Each chapter is defined by an objective mentioned in the chapter book (e.g., defeating all enemies) that must be completed within a set number of rounds, while also rewarding players with bonuses if they finish the chapter with leftover resources (e.g., additional Fruit).



Figure 4.5: Close up of the board in an Adventure Chapter

Each hero is defined by a unique deck of cards and a combination of traits, both of which players can upgrade across chapters. Each chapter unfolds over a total of twelve rounds and players fail a chapter if they take longer to complete a chapter having to restart it. (A turn) At the start of every round, players choose a card from their hand and reveal it simultaneously (players also take a card from the enemy deck that states what he will do for that round). This card determines whether the player or enemy changes their initiative (increases/decreases) on the initiative track, after which both players and enemies take turns accordingly.

On a player's turn, the card selected is first placed onto the Nexus Grid, after which the player then activates the spaces from the row or column corresponding to where the card is placed, triggering the actions from those spaces. Cards remain on the grid until a full row or column is completed and cleared. Players may perform from the listed actions:

1. Movement - Move up to the amount of hexagons mentioned.
2. Attack - Choose a target and roll the amount of dice mentioned.
3. Chain Attack - Can be chained with other chain attacks (e.g., combining 4 attack from one card with 2 attack from another card)
4. Gain Resources - Gain a specific type of resource (e.g., +2 Spirit)

When two players position themselves on opposite sides of an enemy, they gain flanking that can grant advantage (i.e. additional damage). Conversely, ranged attacks made from hexagons adjacent to enemies impose disadvantage, reducing damage output.

Additionally, once per turn, players may use the Interact action to engage with elements on adjacent hexagons, such as other players or resources. When interacting with other players, they can trade resources, heal them using Fruit or revive. When interacting with a resource, they can collect it.

As chapters progress, enemies grow more complex and demanding, and require players to exploit advantage, manage resources carefully, and synchronize their actions to complete objectives. At the end of a chapter, players gain XP, Fame, and other rewards based on their performance.

#### 4.1.4 Interlude Chapter

At the end of certain chapters, players return to town and can upgrade their characters by purchasing new cards, items and interacting with Encounters. Each visit unfolds across three days (rounds), during which players spend their time taking actions. In each day players must follow this structured sequence that repeats over the course those rounds, after which players proceed to the next chapter:



Figure 4.6: Available action spaces during the Interlude Chapter

1. **Naviri Encounter.** The group draws an Encounter card and collectively decide how to respond to it (selecting one of two options), that may grant rewards or impose negative effects (e.g., players start the next adventure chapter with 1 less Resilience).



Figure 4.7: Encounter cards

2. **Choose Locations.** Players place their character miniatures on one of these several action spaces. Multiple players may visit the same location, and doing so together enhances

the corresponding action (e.g., drawing one additional card that becomes available for purchase):

- **Desert Market.** Players draw items and can buy up to two per visit using Fruit. Visiting together allows players to draw additional items.
- **Citadel Research Lab.** Players draw new cards corresponding to their Fame level (Bronze, Silver or Gold) and may purchase one using XP. Visiting together gives extra draws.
- **Meditation Spring.** Players spend XP to upgrade one of their traits (Spirit, Focus, Resilience, or Synergy) or unlock new skills in their Character Sheet, with reduced cost when visiting with others.
- **Temple of The Breaking Wave.** Players gain XP and may roll dice for bonus XP. Players can also spend Fruit for additional XP.
- **Floating Gardens.** Players can trim cards from their deck using XP.
- **Arena.** Later on in the game, players may choose to play the Arena which simulates the gameplay of Adventure Chapters, to gain XP and Fruit.

Once all players have chosen locations, the actions at each site are resolved in clockwise order.

## 4.2 The Digital Game

The digital component was designed as a continuation between chapters, acting as the Interlude chapter between the first and third chapter of the game. In the first chapter, players must protect their home town from monsters that mysteriously arrive from the Fold. In the third chapter players venture into the Fold to find Takaro, a character who is first mentioned in the digital component. During the Interlude chapter, players can train, earn resources and understand more about the world of Tidal Blades through Encounters. While the board game can support up to 4 players in one session, the digital component was envisioned for up to two players as the length of physical session changes significantly depending on the number of players.

### 4.2.1 Interlude Chapter

We designed and developed a two-player digital game prototype to extend the play experience onto smartphones (Android). We opted to develop the prototype to mobile devices, as it could provide players with greater flexibility in when and where they choose to interact with the prototype. Building on our previous work [34], this prototype is designed with the identified elements that reinforce the sense of continuity in mind. The goal was to complement the board game with digital play sessions, allowing players to engage with the game between physical sessions and experience the digital medium as a continuation of play.

The prototype can be played over three days, with a 24-hour timer between each. The first time a player logs in, a 24-hour timer begins. When this timer expires, the next in-game day becomes

available, but requires players to log in for that day's timer to start. A day is represented by a branching path with nodes that can be Mini-Games or Encounters.

At the beginning of each day, players have one to two nodes available and must complete them before unlocking others. After nodes are completed they become unavailable, but are unlocked to the other player. By completing nodes players can gain rewards such as Fruits, Daily Experience and Cards.

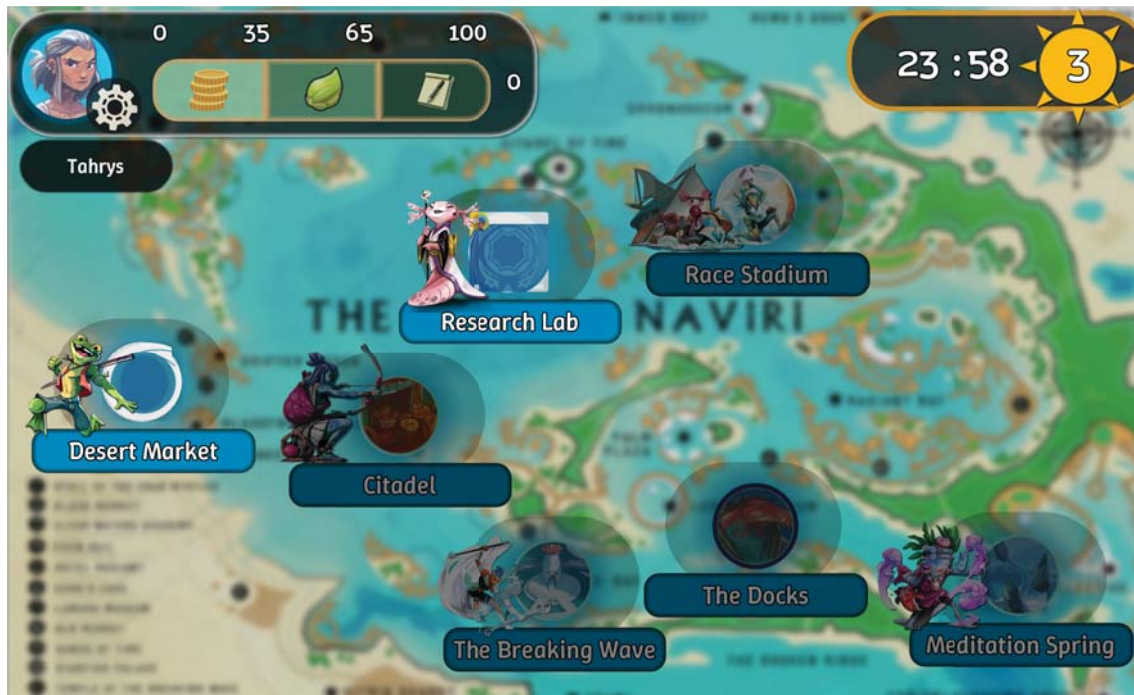


Figure 4.8: Interface of the Digital world map with both unlocked and completed nodes

### 4.2.2 Components

Most digital components are similar to the board game. Some were re-imagined to better fit the digital medium (e.g., Encounter Cards do not appear as cards but instead as dialogue with options) and others were added in order to balance sessions, such as Coins and Daily Experience.

In the board game, players are only introduced to Interlude chapters after chapter five, as they typically lack enough XP to purchase cards earlier. To address this, we introduced Coins that take place after XP and that players can collect daily. Additionally, we also introduced Daily Experience as a way for players to progress and then collect rewards (different each day) after reaching a certain threshold.

### 4.2.3 Elements of Continuity in the Board and Digital Game

To guide the design and development of the digital prototype, we applied the previously found key elements of continuity to maintain a sense of progression and connection across play sessions.

Next, we describe how these elements are expressed in the original board game, then in the digital prototype design as well what elements transition from one medium to the other.

### Progression

Progression in the board game occurs through character and narrative progression. Players advance their characters by purchasing cards and items during the Interlude phase, upgrading traits, and by completing chapters. Narrative progression occurs at the start and end of each chapter revealing story developments, and during the Interlude chapter, where players draw an Encounter card that introduces new characters and narrative.

The prototype expands the board game Encounter card structure (i.e., players only draw one Encounter card per day) into a larger Encounter system as players unlock new nodes. At the beginning of each day players are also welcomed with a daily Encounter that foreshadows what will happen in the next physical session. Similarly to the Encounter cards in the board game, players must choose between two options and receive rewards accordingly, that are then stored in their Inventory.

Contrasting to the Encounter cards of the board game, that are shown to all the members of the group at the same time, players do not have access to the same Encounters initially and must complete them in order to unlock them to the other player.

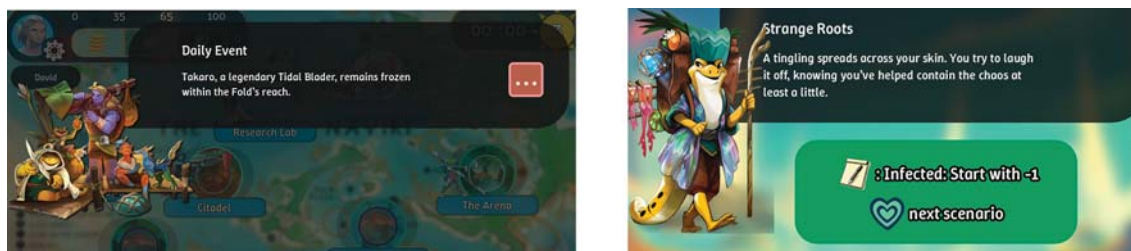


Figure 4.9: On the right, a screen showing the introduction of a daily event, followed by the reward collection.

### Mini-Games

Beyond exploring the narrative, players can also engage in multiple mini-games, that are based on the action spaces in the board game's Interlude chapter (except the Race and the Citadel, which were introduced to diversify gameplay).

In Mini-Games each group member adds his score to a total team score by completing the same mini-game, enabling each member of the group to collect Daily Experience until the combined threshold. While players may only play each Mini-Game once, it can become available for a player to collect rewards once the other player has played and reached a new threshold.

- **Race** Players control a boat on a track, scoring while avoiding wall collisions (which accelerate timer depletion).

- **Meditation Spring** Players drag a shell to score while avoiding Mudcrabs who are pursuing the shell.
- **Temple of The Breaking Wave** Players tap to jump between upper and lower walls to dodge obstacles and score.
- **Floating Gardens** Players drag a watering can to water fruit to score, while avoiding a Mudcrab.



Figure 4.10: Images of the Floating Gardens, Race and, Citadel Mini-Games



Figure 4.11: Images of the Meditation Spring, and Temple of The Breaking Wave Mini-Games

We also implemented the **Arena chapter** from the board game which has players using their original decks (with also new cards purchased from the market) and play using the mechanics from the first chapter to face sparring partners in a free-for-all combat. After each match, players can also collect Daily Experience based on their performance.



Figure 4.12: Images from the Arena, showing the card and action selection phase, followed by the grid placement

Players can also purchase new cards and items from the Research Lab and Desert Market, both of which remain accessible throughout the day until players make a purchase. Cards purchased digitally can be used in the Arena and are carried over to the next physical play session, however, items only become available in the following session. Similarly to the board game, players are

only able to purchase one card or item per day, with costs balanced accordingly. Each market closes for the rest of the day once a player makes a purchase. Although the markets are accessed individually, any card or item bought by one player becomes unavailable for the other.

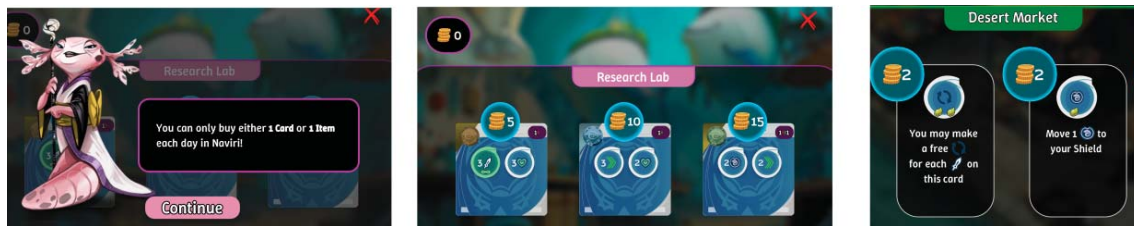


Figure 4.13: Interfaces from the first time a player enters the Card and Item markets, and both Card and Item markets respectively

### Mastery and Knowledge

In many campaign board games difficulty progression is built into the experience, in *Tidal Blades 2* each chapter introduces new mechanics that require increasingly careful planning from the players, encouraging collaboration and communication among the group.

In order to give players a sense of training or practicing for the next session, we implemented the Arena that could be unlocked by players. While in the Arena, players play as if they were in the physical session in an hexagonal grid, using cards to defeat opponents and scoring based on which opponents they defeated. We designed the arena to have a free for all combat, allowing enemies to choose the best target for their attack (i.e., can also be another enemy). Enemies could be either a Sparring Partner or the Trainer which had more complexity (i.e., with additional event cards that triggered at the beginning of each round, such as “Move 5 towards the lowest hero”) and was harder to defeat. Each enemy had their unique card deck and prioritized different strategies depending on their deck (e.g., ranged attacks make the character try to move further in order to not be in disadvantage).

In contrast to the collaborative nature of the board game, this mode is designed as a more individual experience.

### Sociality and Out-of-Session Continuity

One of the ways *Tidal Blades 2* emphasizes collaboration is by motivating the group to discuss and coordinate actions in order to complete objectives. In the previous Chapter (Chapter 3) we found that while players may associate the sense of continuity with the group to which they share a play experience, they also value the flexibility given by the digital medium in allowing them to progress without needing the entire group to be available.

With this in mind the prototype was built around ways for players to feel some collaboration in the game when playing at different times (players could still play at the same time). For this, we designed systems that allow players to be aware of each other’s actions and motivate discussion outside of the game, such as highlighting whenever new content is unlocked by the other player

(Mini-Games or Encounters), contributing to shared scores in Mini-Games, mentioning what option the other player chose in Encounters, and what card or item a player bought in the Markets.



Figure 4.14: Image of an Unlocked Node by partner, and Node with available reward

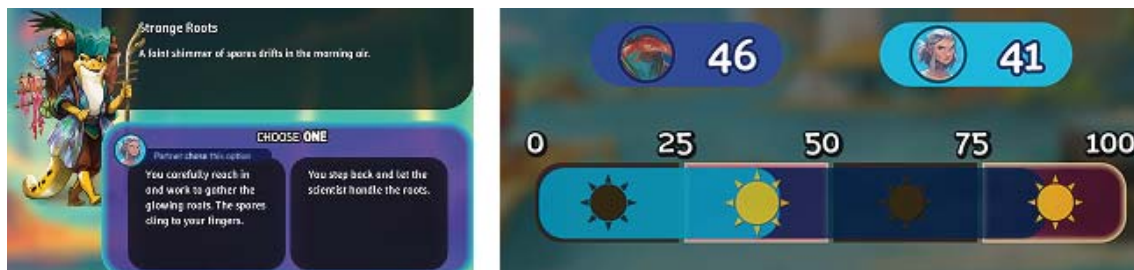


Figure 4.15: Image showing which option was chosen by the other player, and the group score in a Mini-Game

#### 4.2.4 Developing the Prototype

For the development of the prototype, we made use of the Godot Game Engine <sup>5</sup>. To handle communication between game instances, as well as authentication and logging features, we made use of Google's Firebase Realtime Database <sup>6</sup>. The game's graphics were adapted from assets of Tidal Blades 2: Rise of the Unfolders <sup>7</sup>, and the Role Playing book <sup>8</sup>. Some graphics such as icons were generated using the Midjourney software <sup>9</sup>. Sound files were curated from OpenGameArt <sup>10</sup> or generated by ElevenLabs <sup>11</sup> and post-edited in Audacity <sup>12</sup>. Videos were captured using the XBOX Game Bar <sup>13</sup> and tailored further in ClipChamp<sup>14</sup>. Below we detail the various systems in the game.

<sup>5</sup>Godot Game Engine. <https://godotengine.org/>

<sup>6</sup>Google Realtime Firebase. <https://firebase.google.com/>

<sup>7</sup>Tidal Blades 2. <https://www.allplay.com/board-games/tidal-blades-2/>

<sup>8</sup>Tidal Blades: RPG. <https://www.allplay.com/board-games/tidal-blades-the-rpg/>

<sup>9</sup>Midjourney. <https://www.midjourney.com/home>

<sup>10</sup>OpenGameArt. <https://opengameart.org/>

<sup>11</sup>ElevenLabs. <https://elevenlabs.io>

<sup>12</sup>Audacity. <https://www.audacityteam.org/>

<sup>13</sup>XBoxGameBar. <https://www.microsoft.com/en-gb/windows/tips/game-bar>

<sup>14</sup>ClipChamp. <https://clipchamp.com/en/>

**Assets.** Based on our previous findings in Chapter 4, we aimed to give players a sense of familiarity by closely matching the visual style of the board game. All visual assets were created to remain consistent with the Tidal Blades universe, helping players quickly recognize and connect with the world after completing the first chapter. Most assets were cut and digitized from the Role Playing Game book, with the exception of the character used to introduce a Mini-game. Characters, cards, and resource symbols were reutilized and adapted for each playable character using Adobe Illustrator<sup>15</sup> or Figma<sup>16</sup>. The goal was to achieve higher quality through vector-based illustration before exporting them as PNG files.

Some additional icons, such as the Notes, Coins, and Backpack (to symbolize Inventory) were generated using MidJourney<sup>17</sup> or sourced from stock image libraries (e.g., FreePic<sup>18</sup>). To record the videos that introduce each mini-game, we used the Xbox Game Bar software<sup>19</sup>. Video trimming and formatting were performed using ClipChamp<sup>20</sup>.

**Game Engine.** We used the open source game engine Godot to develop the prototype. Unlike other game engines, Godot is built around a node-based architecture where every element in the project is a node that can be independently accessed and customized with specific behaviour by script. Godot has flexibility when working with external APIs and multiple data formats (such as the Firebase and JSON), enabling easier data handling through HTTPRequests and connection to the Firebase. The main languages used were GDScript (Godot's native scripting language) and JSON for data handling (e.g., loading encounter texts and reward information).

**Mobile Interactions.** While Godot has native support for touch-based interactions these did not work in multiple devices, so we had to implement interactions such as dragging (e.g., creating a control wheel that players could drag) and clicking (e.g., to change positions or interact with a specific node).

**Firestore.** All gameplay data both from the physical sessions and the digital prototype was stored using Google's Firestore Realtime Database. This database enables data to be updated and retrieved quickly, which allowed the prototype to synchronize both players' progress when players are also playing simultaneously. The use of Firestore required a stable internet connection, as progression depended on data access and storing. Player authentication was also handled by the Firestore by verifying credentials against stored entries.

The database was structured in groups of 2 players. Each player had a dedicated entry that stored all gameplay-relevant variables such as: resources and rewards obtained, cards and items bought from the Markets, character progression (traits, experience), narrative decisions, deck changes, progress associated with each mini-game and thresholds collected, daily experience and rewards collected, and the state of nodes (unlocked or completed). Whenever a player performed an action such as completing an Encounter or Mini-Game, this was stored in the Firestore through

<sup>15</sup>Adobe Illustrator. <https://www.adobe.com/pt/products/illustrator>

<sup>16</sup>Figma. <https://www.figma.com/>

<sup>17</sup>MidJourney. <https://www.midjourney.com/home>

<sup>18</sup>FreePic. <https://www.freepik.com/>

<sup>19</sup>XBoxGameBar. <https://www.microsoft.com/en-gb/windows/tips/game-bar>

<sup>20</sup>ClipChamp. <https://clipchamp.com/en/>

requests.

When players logged in a refresh timer periodically checked for changes in the game, allowing the other player's game to react quickly (depending on the internet velocity). Before the second physical session, the database was consulted to retrieve each player's accumulated progress (items, notes, upgrades, etc.), ensuring that everything achieved digitally was accurately transferred back to the physical format. Additionally, the stored data allowed us to observe playtime and decision patterns.



Figure 4.16: Login Screen Interface

**Player Inventory.** Players were able to access and close their inventory by clicking the backpack symbol close to the player icon. In this inventory players are able to see how many resources they have (e.g., Coins, Fruits) and access their deck, Items and Notes.

**Day Counter.** By looking at the top right corner players are able to see which day it is of the three days and how much time is left on that day.

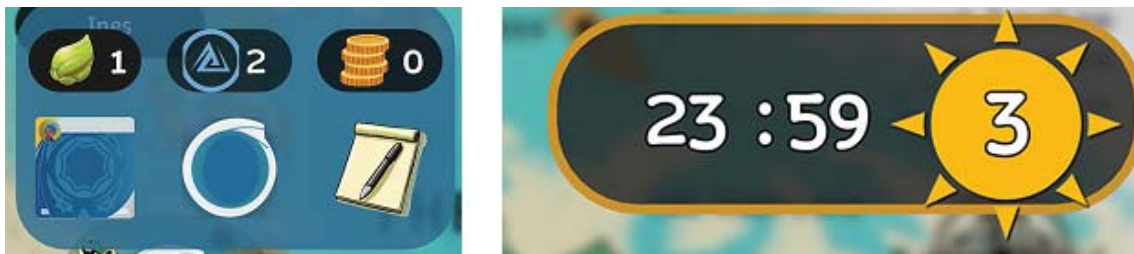


Figure 4.17: Player Inventory Interface and Day Timer

**Daily Rewards and Progress.** As mentioned previously, each day had different daily rewards, that were thought to keep the player engaged and motivated for the next session (e.g., new cards). Players could track their daily progress through a segmented bar, located in the top-left corner of the screen, that animated upon receiving Daily Experience. Rewards could be collected upon reaching three distinct thresholds (25, 50, and 75 points), appearing highlighted when ready for collection. For later analysis, each player's Daily Experience was recorded in Firebase upon every increase, allowing us to access individual player activity.

**Encounters.** All data from Encounters was written in multiple JSON files, and retrieved whenever players interacted with an Encounter. As Encounters had multiple options that adapted



Figure 4.18: Daily Rewards Interface

the narrative to the player's choice (Effect A or Effect B) the file included multiple branches. When completing Encounters, the player's option (Effect A or Effect B) as well as the reward was stored in the Firebase. Whenever players interacted with an Encounter unlocked by the other player, Godot showed what option they chose by requesting it to the Firebase and show it to the player in the option selection interface. To add some variety to the digital prototype we implemented a total of 21 Encounters (3 daily Encounters).

**Mini Games.** Mini-games were adapted from the free open-source mini-game library Librerama <sup>21</sup>, with exception to the Race which was built from the group-up. This meant changing the original mini-game ending conditions (e.g, when the timer ends or whenever the player loses all lives), adding scores, and changing all assets to fit the theme of Tidal Blades accordingly. Whenever the player concludes a mini-game he goes to a conclusion screen in which he can collect the daily experience and see the total score of the team.



Figure 4.19: Comparison of before and after asset changes in Mediation Spring

**Arena.** The arena is composed of a free-for-all battle between 3 Sparring Partners (player is included), and one Trainer that was more difficult to defeat and rewarded players a bigger score (3 as opposed to 2). We replicated the Arena scenario from the board game in digital form. As such, enemies had complex behaviour and followed the rules of enemy priority of attacks and movement in the board game. Enemies optimized attacks based on the card drawn from their deck (e.g., keeping range from targets if the attack had range or prioritizing low health enemies to score faster).

Additionally, the Trainer had event cards and could do additional actions in the beginning of each round, with a total of three event cards (*“Move to the furthest target and heal 2 Resilience”*,

<sup>21</sup>Librerama <https://librerama.codeberg.page/>

*“Move all targets 5 spaces towards her”* and *“All targets take as many hits as shown in the die”*). Rounds in the Arena followed the same structure as in the board game, with the exception that the Trainer selects and resolves an Event card at the beginning of each round. Players can use attacks or chain attacks and target enemies by clicking on them, move by clicking the highlighted hexagons (in range of the player), gain resources by clicking action skills, collect fruits by moving through hexagons or using the interact action. By completing the Arena players gain Daily Experience depending on their score position (1st - 50 points, 2nd - 30 points, 3rd/4rd - 15). The arena takes longer to complete ( 30 min), with the prototype having a total of 44 different cards (including enemy cards, such as Sparring Partner cards and Trainer Event cards) all with different behaviours and effects (full list in appendix).

**Markets.** In the Market nodes players are able to buy cards or items. Players can use cards in the next Arena fight, as opposed to items. In the Card market, players are able to buy cards of three ranks (Bronze, Silver, Gold), with each rank having a higher cost but also with better actions. Cards from the market appear stronger than the ones present in the player deck (e.g., some introducing healing or ranged chain attacks). The Item Market has 4 different available items each day and each cost two Coins (full list in appendix).

## Chapter 5

# Evaluating Continuous Transmedial Play

In this section we discuss the procedure carried throughout the study, methods used to evaluate continuous transmedial play, the study structure (detailing how players engaged in physical and digital sessions), as well an understanding of the recruitment process and characterization of participants. We also give an understanding on how we collected the data during physical and digital sessions and how this was later analysed. Our research questions were:

- **RQ1.** How does transitioning between mediums in a continuous gaming experience affect player engagement, sense of continuity and group play?
- **RQ2.** What design choices contribute to (or hinder) engagement, continuity and group play?

### 5.1 Procedure

We adopted a qualitative approach to data collection and analysis. This combined two in-person play sessions with each group (2-3 participants) in a laboratory at our faculty, where participants played a scenario of the board game (90-120 minutes), a digital session in between where two-participants continued to play within the next few days (30 minutes per day), and a semi-structured interview lasting approximately 45 minutes at the end of the second in-person play session. We have also collected some quantitative data related to how much progress each participant was able to achieve during each day in the digital session, however this was not used for analysis.

While digital sessions were designed for up to two players, we allowed participants to take part in the study in groups of three. In this scenario, one participant did not engage with the digital sessions, which provided additional insights into the experience of players who could not interact with the prototype.

Before the first play session, participants were asked to complete a demographics questionnaire about their gaming habits (e.g., frequency of board game play, level of intimacy with other members of the group). One researcher was present throughout the session to provide a brief recap of the game rules, clarify any uncertainties, and answer participants' questions to ensure

a smooth and engaging play experience. Participants were able to schedule the second session during recruitment, during the first session or after leaving the laboratory. All questionnaires were administered through a link to Google Forms.

### 5.1.1 First in-person session

Participants were tasked with completing the first scenario of the campaign, which is meant to be relatively easier than the following chapters as to accustomize players to their decks, enemy mechanics and flow of gameplay. Before starting the scenario, participants were introduced to their respective character sheets, initial traits specific to the character they choose, and what they specialized in (e.g., ranged attacks), as well as enemy mechanics. In groups of three, the group had to choose which two participants would later interact with the digital application. The setup of the game was pre-arranged in a suitable table before participants arrive at the laboratory room, however, to facilitate rule learning, the researchers who were present completed the character setup together with participants.

**Chapter description.** Players play on a small map and are tasked to defeat all monsters collectively before reading the next chapter entry. This scenario is built into two different phases. Initially, players need to defeat all enemies, which allows them to create familiarity with their decks. The second phase then introduces new monsters with a new set of attacks, and a new mechanic where players must use the Interact action to save as many citizens as possible, as this will influence the amount of rewards received at the end of the chapter (e.g., XP or Fame gained).

Before the beginning of the second phase, one researcher asked participants if they wanted to continue the scenario or stop, and receive rewards according to their current progress. If they choose to stop, the researchers explain the rest of the scenario (narrative and gameplay) and let participants read the next entry. The board game requires players to complete all phases of a chapter before proceeding to the next one and receive rewards, however for this study our goal was for participants to get a good sense of the gameplay and narrative to engage with the prototype after. Instead of gaining the respective Fame and Experience Points, participants received half of the rewards for completing the first phase, and the indicated rewards if completing the two phases of the scenario.

**End of the scenario.** When finishing the scenario participants wrote their progress into the respective Character Sheet, marking Wounds, Fame, Experience and others, which influenced their starting resources in the prototype. One researcher then showed a QR code for participants to scan through their smartphones and download the prototype, which could be accessed through a given ID and password. Participants were also asked to only interact with the application after leaving the laboratory room. Relevant data from this session, such as player cards and player nicknames, were recorded anonymously in a database to serve as a bridge to the digital session as well as determine the player starting resources when first logging in.

### 5.1.2 Digital session

Participants were invited to continue the game in-the-wild over the following one to two weeks using a digital prototype. The prototype was designed to span three days, which could be played with intervals between them.

To allow participants to progress freely (i.e., without having to wait for each other) and balance progression, whenever a player accessed the prototype a 24-hour timer started which marked the end of a day. When this timer expired, participants could advance to the next day by logging in again, or automatically if they were already logged in. The prototype implemented a progress system, which allowed participants to acquire items, cards and other resources, which were carried forward to the second physical session. The narrative involved in the prototype connected the first and second physical session (chapters 1-3), serving as the second chapter of the game.

### 5.1.3 Second in-person session

In the beginning of the second session, researcher(s) welcomed the returning participants. Similarly to the first step, one researcher was present throughout the session to provide a brief recap of the game rules and answer participants' questions. During character setup, participants who engaged with the prototype received a new Character Sheet detailing the components earned while playing digitally (e.g., gain the card "*Honored by Mansiki*" G24 or increase your Focus by 1). A researcher then assisted them in retrieving the obtained components from the physical game materials and updating their original Character Sheet. After this, participants played a more advanced scenario (chapter 3) as compared to the first in-person session.

**Chapter description.** Similarly to the first chapter, in this session the group must complete a two phase scenario. Participants are introduced to a boss enemy, with mechanics hinted by the digital session such as Event Cards in the Arena, and other mechanics which are negative to the player. The boss enemy also includes other mechanics which were explained to participants in the beginning of the session.

**Interview.** At the conclusion of the chapter we conducted a semi-structured interview. Each question was first addressed individually, after which participants were encouraged to discuss their perspectives together, if they wished. After the interview, we clarified any questions the participants might have had, ensuring no distress was caused during the study.

## 5.2 Recruitment

To reach volunteers, we relied on word of mouth and open calls shared in gaming communities (e.g., Telegram groups, Board Game Geek). Volunteers filled the application form, which includes a briefing of the study, participation terms, and informed consent. Participants were asked to learn the rules of the board game in advance, we recommended video tutorials to support them, however, one researcher explained the rules whenever necessary. In case a group registers to the study with more than 2 participants, it was informed that only two of them were be able to interact with the

digital prototype, and the group was asked to decide who could take on that role (this could also be done in the beginning of the first in-person session when doing character setup).

Participants could schedule the first and last session of the study when most convenient (e.g., after completing the first chapter, or after completing the digital session). Participants were requested to keep the same group of participants throughout the study.

### 5.3 Participants

In order to participate, participants had to meet several criteria: be 18 years or older, be familiar with board games and play them regularly, and participate with a gaming group consisting of two to three players (who also fit these criteria). Participants needed to understand English as the game is in English and own an Android Smartphone in order to execute the application. To participate, individuals consented to some game data from both the first analog session and the digital prototype being stored anonymously in a database (e.g., character cards, health points, collected items). This data was used to carry over player progress between the analog and digital sessions, maintaining a sense of continuity as participants transition between them. In addition, participants agreed to take part in the in-person sessions, during which they were observed by one or more researchers and audio-recorded during the semi-structured interview. Participants were able to apply by completing a form that included a study briefing and consent to participate.

In total, 16 participants (7 groups) enrolled in the study, including 10 male and 5 female participants, with ages ranging from 20 to 53 years. The frequency of board and digital game sessions varied among participants, as did their progression in the digital sessions (with no group able to reach completion in all 3 days). Participants within each group were either friends or family. Specifically, participants P1–P2, P11–P12, P13–P14, and P15–P16 were in a relationship, while P9–P10, P13–P14, and P15–P16 were family members.

### 5.4 Data Collection and Analysis

Data was collected through questionnaires, note-taking, logging of digital play interactions and the audio recorded interview. To analyse this data, we adopted the codebook thematic analysis approach outlined by Braun and Clarke [17]. As we had pre-established research questions, the process began with generating codes deductively, informed by those questions (e.g., Benefits of continuity). The interview's audio recordings were transcribed, and subsequently read and reread to allow for data familiarization. We then started inductively generating new codes. Two authors were involved in this process, first coding a set of two interviews independently and then meeting to discuss their initial codes. We then refined these codes throughout multiple meetings adding, merging and removing codes as needed. Then, the first author used the final codebook to code all transcripts. Following this, we identified and refined themes based on recurring patterns in the data. We had a final meeting with the whole team to discuss, refine and name these themes.

Our analysis focused on understanding participants' perspectives regarding how this approach

ID	Gender	Age	DF	AF	DFG	AFG	PD1	PD2	PD3
P1	F	25	W	W	(P2/W) (P3/W)	(P2/W) (P3/W)	100	100	33
P2	M	24	AE	W	(P1/W) (P3/W)	(P1/W) (P3/W)	73	35	55
P3	M	24	AE	W	(P1/W) (P2/W)	(P1/W) (P2/W)	-	-	-
P4	M	26	AE	W	(P5/M)	(P5/M)	100	0	100
P5	M	32	W	M	(P4/M)	(P4/M)	100	X	79
P6	M	24	AE	W	(P7/W) (P8/W)	(P7/W) (P8/M)	2	100	100
P7	M	24	AE	M	(P6/W) (P8/M)	(P6/M) (P8/M)	100	6	100
P8	M	27	AE	M	(P6/W) (P7/W)	(P6/AE) (P7/M)	-	-	-
P9	F	53	W	M	(P10/M)	(P10/M)	100	9	100
P10	M	20	AE	M	(P9/M)	(P9/M)	100	100	66
P11	M	21	W	M	(P12/M)	(P12/M)	100	79	100
P12	F	20	AE	M	(P11/M)	(P11/M)	100	0	100
P13	F	43	AE	AE	(P14/M)	(P14/W)	25	0	0
P14	M	48	M	W	(P13/M)	(P13/W)	34	0	0
P15	F	30	M	M	(P16/M)	(P16/M)	1	0	0
P16	M	30	AE	M	(P15/M)	(P15/M)	96	0	0

Table 5.1: Details of the participants, including gender, age, digital gaming frequency (DF) and analog gaming frequency (AF), digital gaming frequency with group (DFG) and analog gaming with group (AFG), progress achieved in digital sessions in day 1, 2 and 3 (PD1, PD2, PD3).

fits, and could fit, within their existing play habits, as well as how it shaped their engagement with the game. Particular attention was given to how players perceive the continuity between mediums, the role of social interaction, and the potential trade-offs and imbalances they experienced during play. All data was stored in a secured database, accessed only by the researchers who conducted the analysis, and will be deleted within a maximum of five years. Data was confidentially handled in order to prevent subject names or other directly identifiable information appearing.

## 5.5 Study Limitations

This study provides an in-depth analysis on Transmedial Play from participants who play both analog and digital games. We attempted to recruit players who had experience playing both board and digital games, but we were unable to recruit a large number of participants. Additionally, we made an exception for P13 and P14, who were only able to participate in the interviews remotely; therefore, these participants did not play the game in the second session. While we made an effort for the prototype to be as close as a fully fledged mobile game as we could, it was still prone to small errors which could require participants to restart the application.

## 5.6 Findings

We now present the themes, supported by participant quotes and highlighting insights into how transmedial play can affect the player experience, its tradeoffs and how it can offer new opportu-

nities in game design.

### 5.6.1 Connecting Lore to Mechanical-Progression

When first logging in to the app players were presented to a zoomed out world map with various locations and a welcome message through the Daily Encounter. This initial connection was mentioned as important as it allowed participants to perceive the digital medium as a continuation of the previous session, as P5 mentioned:

*“I liked the idea of as soon as I open the application, it said “Oh you saved that situation that you played here [physical session], and now you are in the aftermath”. So the idea that things are crossing from one thing to the other was a good initial contact that I enjoyed”.*

Through the digital medium participants felt they could get a better notion of the gameworld, as unlocking new map locations and meeting new characters gave them a deeper sense of immersion, as P2 suggested:

*“Here I can’t really capture well an overview of the world, however in the digital. . . the map has locations with different names and characters which we have not seen. . . You start getting that feeling of immersion”.*

To some participants the value of the digital medium in transmedial play was justified by how it allowed them to grasp a deeper understanding of the game universe through “narrative bits” (P16) or by how it could meld or generate this narrative based on previous group decisions:

*“Board games are more restrictive when they try to be more narrative, there is not freedom to modify things, or improvise. . . it would be good if the narrative could be improvised” - P8*

However, some participants preferred if their actions dictated more impactful changes in the next session, for example, by having the events that happened in previous sessions (e.g., meeting a new character) linked to changes in gameplay:

*“What enemies did we defeat. . . ? Maybe we let them run away and that could appear in the story, and now we have to defeat it in the digital session as we let them escape”.*  
-P4

Participants saw multiple ways this could happen such as by introducing the characters in the game based on their role, “The character we saved could now join the city. . . open a new shop or open a new space to train since he was a veteran. . . we could train with him” (P6) or by having traits tied to a character influencing the gameplay, such as “hiding parts of the map” (P1) to reflect the introduction of the blind trainer Takaro in physical sessions. But also by linking mediums purely through theme (e.g., the area which they are fighting in), as P2 suggested, “In the first chapter we unlocked the Port area. . . now we could . . . send ships on expeditions and they bring loot”. P5

also imagined this scenario where future digital sessions could further distance themselves from the gameplay of physical sessions:

*“I would use the board game to go back to The Fold, and then go to the Digital and do the city stuff, and that could be more interesting, you could alter the city gameplay. . . and do something completely different like city building”.*

P8 showed some concern around this approach, as it might cause players to perceive physical and digital sessions as separate games instead, *“If I want to play this, I probably don’t want to play something that is different. I want to play this, and because of that the digital part has to be the same thing, but digital”*.. This sense of disconnection seemed to be especially pronounced in the Mini-Games, as participants felt that, although they used the same visual elements, their gameplay was not connected to the on-going narrative, as P4 suggested – *“I felt like the gameplay did not have much relation with the game just referring to the same cards and values, except for the Arena. . . which was interesting”*.. In order to avoid this P5 mentions that elements that are important in the physical session need transit to the digital medium:

*“Fame could influence NPC’s and the rewards they give. . . Maybe you could trade fruits for rewards. . . stuff like that. More importantly it is to put the mechanics of the game, it could be the shells, it could be the grid so the digital game is closer to the analog game, if it was like that I would enjoy more making this transition [between mediums]”.*

### 5.6.2 Advancing through different forms of play

Advancing progress within the game through different forms of play was valued by most participants. The flexibility provided by the digital medium was seen as a way to progress whenever it is not possible for the group to meet in-person in physical sessions. In groups with not enough time to complete a chapter during the physical sessions, the app could serve as a saving mechanic which recognizes the state of the board and then lets players continue gameplay through digital sessions. This was seen as a way to support longer games that unfold across multiple sessions (e.g., games with several chapters), as P14 explained:

*“We never opened it — we know it’s a campaign and that it will take time. We might play once and then only return to it occasionally, and that creates limitations. The app could allow progression in campaigns without forcing everyone to be seated every week to play it.”*

However, the feasibility of capturing the board and transitioning to digital sessions may also vary by genre. P14 also suggests that games characterized by open information and social negotiation such as Diplomacy are more easily suited for transmedial play, as the digital medium can facilitate communication over longer periods without losing the essence of the physical experience:

*“You can have all the conversations digitally through chat, you make one to two turns per day and that turns it... it makes a game well playable digitally and then if you take the scenario just as you have it and set it up, you can continue the experience exactly as it is with no unbalances”.*

Participants also noted that transmedial play can allow the game to progress by splitting members across digital and physical sessions according to their availability, as P2 mentioned, *“People join in a session all together and then split...we would play digitally during this time but then... you have parts of the group getting together in some moments and the whole group in others.”*, or even preference *“I have a group of friends... but one does not like board games and likes digital games so here I we can unite people who are usually not playing the same type of game, by having this difference between analog and digital”*(P1). Player regroupings however, should have some influence in how the session unfolds, as P4 suggested:

*“You have a person who enjoys the board, one that enjoys the digital. They could play the parts they enjoy the most, but maybe from two to two weeks, less frequently than when they play their part individually. They play the other part...and bring something with them.”*

Also depending on individual preferences (e.g., preferring to play board games, over digital games) mediums could have different weights in the experience, as P4 mentioned: *“I would prefer if it was... ok, here [pointing at the board], we are saving things and in the other [digital session] we will increase our relationships, we will talk with various characters, and it could that they appeared, or not. But not something significant in terms of gameplay”*. P5 also associated the supportive role of the digital medium to fulfill smaller windows of time to play and preparing for the next session, such as by learning rules or as a way to explore additional content:

*“If I know I will play this [points at the board] at home, I'm on the bus and I remember 'Oh, they have an app' — that gives me the rules, my stuff, and with every rule or thing that I get, unlocks new stuff here [physical session]... The time you invest outside of the game is rewarding...”*

### 5.6.3 Bridging the Gap Between Sessions

The flexibility aspect mentioned previously was also seen as a way to not lose track of what happened between sessions, especially if there is a longer time gap between sessions. Participants imagined how the digital medium could help bridge this gap by being aware of the progression done by other members of the group in the game, or by reminding players of what happened in previous sessions by letting them *“annotate stuff”* (P10) until the next physical session. The Arena was seen as a key aspect in reminding players of the gameplay and rules of physical sessions:

*“I feel like the online [digital session] was essential for me to be here today and be willing to play because many times when I play the physical I forget the rules or*

*something like that. . . Today I came here really willing to play, which is not usual when I start playing.” – P11*

P9 mentions how remembering the events and gameplay of the previous physical session can serve as a motivator to do physical sessions especially for groups who usually play board games that require multiple sessions (e.g., campaign games), “*Whoever likes board games always wants to finish the campaign. And this digital part. . . doesn’t let you forget the game. It makes you more willing to play, really try to group our partners to continue playing. When sometimes we don’t group up so much maybe*”. Having additional content to the main story (e.g., exploring other parts of the map or other Arenas to train) was also seen as a way to sustain momentum between sessions, as P1 mentions:

*“having even more stuff, we have quests then we have the story, then we could have side quests and the fact that they are side quests. . . I don’t know stuff to do until we go to the next session as a group, could help not lose the rhythm”.*

Transitioning from one medium to the other especially after a longer time gap was seen as an important step in maintaining the experience cohesive. In this study participants had to write in their Character Sheet their accomplishments at the end of the first session. In the second physical session they were given a sheet during setup, stating the rewards achieved in the digital session which they should collect from the board game box. P2 mentioned how the digital medium could aid players during this step, such as by showing the player an updated digital Character Sheet:

*“To transit to the other medium you need something from the first. . . before you start the digital . . . you need to go to the Character Sheet and see your physical information. . . and then to transition from the digital to the physical, before you start your physical session”.*

Other participants suggested that the digital medium affordances could also be leveraged during physical sessions, by letting the medium have a more active role during the session:

*“I feel that maybe the app could have a component not outside of the game, which could also influence directly, in real time, maybe a random buff in the middle because you did something before. Maybe we could also benefit from the digital medium, there is stuff that we can’t do here.” (P6)*

Providing players with an understanding of how game elements such as rewards carry over and affect subsequent sessions was seen as important. Participants felt that while certain rewards obtained in the digital medium would influence the next session, this was not always the case. This was particularly evident when elements appeared visually similar across mediums but served different purposes, such as the Fruits marked in the Character Sheet to further advance in character Path and the Fruits which players could use during the digital session to gain Resilience. P5 explained, “*Here we saved the people. . . there is a direct continuity, the story. The problem for*

*me was that these elements were too identical, for example the fruit... I didn't know where I was gaining this, if it was for the phone or the physical.*" In contrast, the role of elements anchored in one medium, such as Coins which acted as currency to buy cards in the market, were easier to understand:

*"The cards I knew because here while there were cards in the Arena they belonged to my deck, which is part of the game... . The coins I understood as being only a part of the digital, because there is no financial component here [physical]." -P4.*

#### 5.6.4 Balancing Individual and Group Progression

The digital medium allowed players to play asynchronously, without requiring each other to progress. For participants who valued the social aspect of board gaming, this aspect also made them feel little interaction with the rest of the group:

*"We didn't talk much... there was the novelty thing, the game was new and in the beginning we were showing each other like "look at this, and this and this" discovering the game, but after the second or third day I noticed that, well everyone does their own thing, maybe we could ask "Oh have you been there?" [in the app]..., stuff like that... I forgot it. - P2"*

To mitigate this, P1 emphasized that the digital medium should be able to accommodate mechanics which emphasize the social aspect of play, such as shared rewards or shared goals:

*"This is what we brought and then we distribute it among us. I think it's interesting because maybe I have a lot of availability and I play a lot this week, but next week I don't... it allows for that dynamic and lets us talk about it outside [the session]."*

Creating reasons, such as memorable moments could be used as a way that influence social interaction outside of sessions. P2 suggested that introducing moments that feel epic could encourage discussion between the members of the group between sessions: *"The interaction outside the game is about the 'epic plays' or 'epic things' that might happen. I think things like making clips of the game itself generate a lot of interaction."*

The flexibility present in the digital medium also created different levels of progression between members of the same group. While participants cherished this individuality, it could also come with the challenge of balancing progression as it was linked to additional rewards. Participants felt that an unbalanced progression could negatively impact on the experience, leading to players feeling left out and losing motivation to play:

*"You arrive at the session, everyone invested their time sometimes even with lack of availability but they did and you couldn't. Basically you arrive there and feel a bit left out right? You didn't contribute to the game session as maybe the rest of the group did." - P2*

Making rewards shareable could be a way to create more balance, however it could also diminish the feeling of agency in individual progress. In order for the player to also feel included, participants mentioned how he should have the final saying about what happens with the reward after receiving it. P1 suggested how this could be done through the Goal card *“I collected the card but ultimately the one who chooses what happens... is the person who is going to use it..”*. In order for players to not miss out on impactful moments, participants highlighted how the group could assign players to different tasks depending on their availability, with bigger tasks requiring the whole group to be present:

*“Maybe someone that has more responsibility to do specific tasks or activities in the app, sure, they would have a different progression with their character. The part of fighting monsters, for me, could be more collaborative” - P12*



## Chapter 6

# Discussion

Continuous transmedial play was a **positive** and **novel experience** to participants, which could allow for deeper immersion in the game world. Our research aims to better understand factors that shape engagement, continuity and group play in continuous transmedial play. We find including more than one medium in the play experience and playing them independently has several benefits, such as allowing players with different preferences to still play together, but also some drawbacks, especially in areas where flexibility and the weight of time invested meet.

Next, we discuss engagement and identify elements which could motivate players to continue playing, such as having different mediums weights in the experience and degrees of interdependence. We then delve into how players perceive continuity between mediums, including how connections between narrative and gameplay elements can be designed to maintain this continuity, as well as the implications of transitions between mediums. Finally we discuss group play, advantages and challenges associated with how progression should be balanced as it transitions between mediums.

### 6.1 Engagement Through Medium Complementarity

Continuous transmedial play was seen as an effective way to leverage the affordances of each medium and as an opportunity for players to contribute to a shared game experience through their preferred way, such as by only using one of the mediums or having one of the mediums play a smaller role in their experience.

*Medium weight.* Participants felt that the bigger actions were taken in the physical sessions, where the group could meet in-person to discuss the main outcomes of digital sessions such as achievements (e.g., cards and items). While the prototype was designed as an extension to a complete game, the weight of each medium in the experience might have been perceived this way also due to how each medium was introduced to participants during the study, as participants played first the physical session and knew the commercial game had been modified to accommodate in-between digital sessions. Additionally the mobile interactions were created to leverage the medium, such as purposefully shorter sessions (30 min a day) with multiple Mini-Games, as opposed to the 120 minute physical sessions.

We found that depending on player motivations (e.g., using the digital medium to learn the game rules, or to practice and gain new cards) continuous transmedial play should be able to accommodate mediums with different weights while maintaining a sense of progression and meaningful impact in subsequent sessions. For players who value learning more about the game through the digital medium with bigger actions taking place in the physical session, the knowledge acquired by the player should be leveraged in the next session (e.g., learning that an enemy which appears in the next session has a weakness to fire). Conversely, when players prefer to engage with the experience mainly through the digital medium (e.g., due to lack of availability for physical sessions), they should be able to continue the game this way (e.g., completing chapters digitally).

*Degrees of Medium Interdependence.* Previous work in hybrid games [63] has also highlighted the importance of interdependence between mediums in a single play session, or how board game players are more willing to engage with the digital medium during play sessions if it is optional [31] acting as way players could enjoy additional content, not needed to play the board game. Our findings reflect that transmedial play could also be linked to different degrees of interdependence.

Some participants envisioned how mediums could be **interdependent** by having the digital medium act as a way to learn more about the lore of the game or rules. Another perspective emphasized how mediums could be **more dependent**, for example by allowing player actions in digital sessions to directly shape the narrative or gameplay of physical sessions (e.g, meeting a new character in physical sessions, unlocks new areas in digital sessions). Our findings suggest that while a higher degree of dependency between mediums can feel more impactful in gameplay, it might also risk players feeling forced to play, or left out of the experience whenever playing is not possible.

A potential approach to **balancing dependency between mediums** could be to create parts of a session (not needed to progress in the game) which could be unlocked through the other medium, for example creating exclusive missions or chapters in physical sessions, which would require players to unlock them through digital sessions. Further research is needed to understand how different degrees of interdependence can be applied to specific parts of both digital and physical sessions (i.e., which game elements should be more dependent or independent), and how this affects the player experience.

## 6.2 Continuity through Narrative, Progression and Persistence

Continuous transmedial play was seen as an opportunity to create unique play experiences, offering multiple ways for players to shape the game world (e.g., improvising the narrative through actions done outside of physical play sessions), creating a notion of persistence of player decisions across sessions.

Our prototype was designed as an extension to a board game, which could be played for three days and then players would have to play a physical session. Previous work has explored how a player's own narrative can help shape persistent digital game worlds in order to make them more meaningful [38], and how that can have a positive impact by increasing immersion and player

agency in how the game world is changing. Previous work has also emphasized the value of persistent states in board games [8, 106], for example by enabling players to further customize physical game pieces (e.g., character figures), which persist over multiple sessions.

*Similarities in gameplay.* Our findings highlight the role of each medium in creating this sense of persistence through continuity over play sessions with **varying degrees of similarity** in gameplay. When mediums are a **direct translation** of gameplay (e.g., in the Arena or continuing a chapter through the digital medium), continuity can be achieved through keeping track of the progression done by the player or even by allowing the player to practice. However, when gameplay is **further apart** (e.g., players do expeditions in digital sessions as they unlock the Port area in physical sessions), merely connecting sessions through theme cohesion can lead to a disconnection and consequently a break in continuity as players perceive play sessions as different games.

While playing the digital session, participants could engage in a variety of Mini-Games which visually resembled some elements of physical sessions (e.g., watering Fruits), however participants mentioned they lacked connection to the game as they did not reflect the narrative from the first session. While breaks in continuity have also been connected to positive aspects, such as creating excitement and suspense [34], it needs to be more tightly connected to the events that occurred in previous sessions, for example by having a character introduced in a previous session fall from grace as he turns out to be an enemy.

During interviews, participants wondered about how blending the mediums could help create meaning and strengthen the sense of continuity, such as aiding in transitions (e.g., generate a digital character sheet with the progress and achievements from digital sessions during the physical session setup) or relying on the digital medium to remember what happened in previous sessions (e.g., showing a short clip to player about narrative advancements). This suggests that mediums in continuous transmedial play could be associated with **different levels of synchronicity**.

Past work in hybrid games [49, 99, 31] has highlighted the affordances brought by the digital medium during board game play adding more immersion to the game through sounds or automating more boring tasks. Previous work has highlighted how players could be more willing to interact with technology during board game play by making the digital medium invisible (e.g., hiding it in the components of the game) or making it meaningfully integrated into the experience [31, 99].

This work identifies **continuity as a motivator for blending mediums** in a single play session, using the digital medium as an opportunity to capture data (during and in-between sessions) and to create meaningful connections between sessions (e.g., being aware of the progress done by one player during digital sessions and highlight his achievements in specific moments of a physical session).

### 6.3 Preserving Social Play Across Mediums

One of the recognized challenges in board game play is how players have to align their schedules in order to play together [95, 34]. Some board games implement ways for a group to continue the game if one member cannot play for the session, such as “drop in” and “drop out” mechanics

which balance the gameplay (i.e., changing difficulty) depending on the level of progression of the other players. Previous work [94, 119] has also suggested how digitizing board games can be a strategy that allows players to play without having to meet in-person, giving them more flexibility in when they take their turn (which could be hours or even days apart).

Digital sessions were designed towards achieving this **flexibility**, enabling players to individually progress, while still providing collaborative moments such as sharing progress in Mini-Games, or unlocking content for each other. While some participants valued the ability to progress without requiring the group to be together, this also raised some challenges, such as creating a feeling of little interaction between the members of a group and a difficulty in balancing progression if rewards directly influence gameplay (e.g., acquiring new powerful cards).

*Asynchronous Social Interactions.* Previous work explores the dynamics of asynchronous interactions and how they can be leveraged as a design strategy to enhance communication and the social aspect of play [71]. Some commercial solo-player games already implement this approach in order to create interaction between players who play the same game, for example in the game *Death Stranding* players can leave behind elements (e.g., messages) that affect the ongoing world-building or collaborative storytelling of other players, which later encounter them. Understanding how to introduce this aspect into digital and physical sessions could allow players to benefit from the flexibility of the digital medium (allowing individual play) while still feeling part of a shared experience.

*Balancing progression between mediums.* Participants described several strategies for **balancing progression** across play sessions, such as enabling the sharing of rewards and quests, **limiting the progression** of players who are further ahead and **attributing tasks** depending on availability or preference (e.g., tasks which require more responsibility such as planning the next physical session through digital sessions are linked to players with more time). However, these approaches also raise challenges related to player experience, particularly when rewards gained by other group members are not perceived as personally earned, which over time may lead to negative feelings such as exclusion or reduced agency.

Previous work [85] has shown that progression may need to change over-time and can be influenced by multiple factors, including party size and player equipment. Commercial games such as *Guild Wars 2*<sup>1</sup> implement a horizontal progression system to balance gameplay between different levels of progression, where players instantly acquire the best gear when reaching the highest level but can continue playing to gain modifications to that gear which allow them to change stats in the equipment (e.g., changing 10 attack speed to 10 casting speed). However, while progression balancing has been explored in digital games, there is little to no existing work in addressing this topic in board games (e.g., in campaign games).

Building on this body of work, we explore how varying impacts of game elements can be leveraged to balance progression in continuous transmedial play. We categorize elements according to how they affect the player and the group: elements affecting only an individual's journey

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<sup>1</sup>Guild Wars 2 <https://www.guildwars2.com/en-gb/>

(e.g., acquiring a new hat for a character), sharable elements (e.g., knowledge that can be shared with the group), elements that indirectly influence the group (e.g., gaining a card that modifies the difficulty of the next session), and elements that directly affect the group (e.g., unlocking a new chapter).

We further identify the need to better understand the balance between **different levels of participation** and the **effects of game elements** on player progression. In particular, rewards that directly or indirectly influence subsequent gameplay (e.g., cards or items) may be more appropriately tied to collaborative aspects of the experience, such as physical sessions or where their effects are collectively negotiated. In contrast, elements such as knowledge acquisition (e.g., learning a boss's weakness) and customization may be better suited to individual progression within the digital medium.

## 6.4 Limitations

There were multiple possible directions for this approach, particularly in light of the participant insights from the first study (Chapter 3). We anticipated that balancing the flexibility of the digital medium with player progression and group sociality would be challenging, especially given the limited time available to develop the prototype. As these aspects are interconnected, we were required to make a design choice that included tackling one of the aspects. We therefore chose to focus the prototype to support flexibility and individual progression, as these were identified as key advantages of transmedial play. While this digital sessions were designed around flexibility, our findings highlight the importance of sociality and balancing progression in shaping the overall player experience.

We also recognized that alternative approaches were possible, such as allowing participants to engage with the experience through only a single medium (e.g., playing only through digital sessions). While this was partially explored in the second study with groups of three participants (where one participant did not take part in the digital session), allowing players to only engage in the experience through the digital session could introduce additional insights. In particular, it could require addressing how players could maintain a sense of shared play across different mediums through for example, remaining aware of other players' actions and contributions.



## Chapter 7

# Conclusion and Future Work

Our findings from the first study reflect the different ways players perceive they are continuing the same game over multiple sessions, what we later named elements of Continuity. Players may perceive the sense of continuity through different ways, by progressing in a game, by learning more about a game or even by association with a specific gaming group.

Continuity can provide benefits to the play experience, such as how it can form unique play experiences which are different from each group (e.g., in campaign games players can choose paths which will change the narrative entirely). However there are challenges in maintaining this continuity, especially if there are longer time gaps between sessions and players end up forgetting what happened in previous sessions.

From this first study, we also got insights into how the sense of continuity could be achieved in transmedial play, its benefits and challenges. Integrating the same characters and game world was seen as important to give players a sense of familiarity when changing mediums. Participants valued the flexibility provided by the digital medium as they could engage with the game at their own pace. However, this was also seen as a double edge sword especially when groups have different amounts of time to play, which could create different levels of progression.

When developing the prototype for the second study, we focused on addressing challenges highlighted from the previous study, which could come from the flexibility of the digital medium. For this, we created ways for players to individually progress while still contributing to the group's progression, for example through shared scores which they could later collect or unlock new content for each other. While participants were aware of each other's actions and presence in their own digital instance, they mentioned how players with less availability might still feel left out.

We also focused on ways the elements of continuity could be reflected in the app, for example, progression through Daily Experience, learning through the Arena and Sociality through unlocking events and sharing scores in Mini-Games. While the app was developed using the game world and using characters which are later introduced in the game, participants felt the connection could be made more meaningfully by integrating the narrative introduced in one medium into the mechanics of the other.

Through the highlighted challenges, participants saw value in what transmedial play could offer to the play experience, such as allowing groups with different preferences to still be part of

the same play experience, for example by letting players only play one of the mediums and still contribute to a shared experience or engage with additional bits of narrative outside of physical sessions which later could inform gameplay.

The value of including more than one medium in transmedial play showed that it could go beyond what fully analog or digital experience can offer on their own. It might be the play experience for players who wish to be immersed in a continuous game world which does not close after each play session. This work started from a board game to transmedial play, an approach that starts from a digital game to transmedial may further highlight other insights.





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# Appendix A

## First Study - Questionnaire

### A.1 Demographics and Gaming Habits

1. Age

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2. Gender

- Male
- Female
- Non-binary
- Other: \_\_\_\_\_

3. How regularly do you play digital games?

- Never
- Less than once a month
- A few times a month
- A few times a week
- Every day or almost every day

4. On average, how long are your digital gaming sessions?

- Less than one hour
- One to two hours
- Two to four hours
- More than four hours

5. How regularly do you play board games?

- Never

- Less than once a month
- A few times a month
- A few times a week
- Every day or almost every day

**6. On average, how long are your board game sessions?**

- Less than one hour
- One to two hours
- Two to four hours
- More than four hours

**7. How regularly do you play hybrid games?** (A game with an analog part and a digital part, such as a board game with an app or toys-to-life like Skylanders).

- Never
- Less than once a month
- A few times a month
- A few times a week
- Every day or almost every day

**8. Which hybrid games have you played or usually play?**

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## Appendix B

# First Study - Interview Script

### **B.1 What makes players feel that there is continuity between gaming sessions (analog or digital)?**

*Framing* It is possible that in some games you feel there is continuity between sessions, while in others you feel that the sessions are more isolated from one another.

- In what way do you think the games you play or have played give you a sense of continuity between sessions? You can use specific game examples if it helps.
- *Clarification* Taking game X as an example: I imagine you play this game several times across different sessions. Do you feel these sessions are part of a single, continuous experience, or is each session isolated from the others?
- Why? Can you identify why some are continuous and others are not?
- Do you have examples of games where this experience was not continuous?
- *If only digital is mentioned* You only mentioned digital experiences. Do you also have this feeling with analog games?
- *If only analog is mentioned* You only mentioned analog experiences. Do you also have this feeling with digital games?
- *If no continuity is felt* What do you think would give you that feeling between two game sessions?

### **B.2 What elements contribute to this feeling and what impact they have on the experience?**

- What do you think contributes to this sense of continuity between your gaming sessions? (Beyond what you have already mentioned).

- Regarding these elements you identified: how does the fact that it is digital or analog influence these elements?
- What differences exist between single-player and multiplayer games?
- *Clarification* For example, would you say that interactions between players contribute to or break that sense of continuity?
- What specific elements remind you of previous sessions?
- In games where you have this feeling of continuity, what can disturb or even interrupt it?
- *If yes* What caused this to happen? Is there anything that could have prevented it? Did you feel continuity again after that interruption? How?
- *If no* What could interrupt your experience?
- *Cross-medium check* [Apply the interruption factor mentioned for one medium to the other (digital vs. analog)] Do you see any factor that would interrupt the session?
- Do you feel that your experience with a game continues in some way even when you are not playing?

### **B.3 What are the tradeoffs of continuity between sessions?**

- What benefits do you see in a game that provides a sense of continuity between sessions?
- And disadvantages? Was there ever a time when feeling continuity between sessions made your experience worse?
- When should we try to establish continuity between sessions? When does it not make sense?
- Is it the same for analog and digital games?

### **B.4 How can continuity interconnect analog and digital gaming sessions in order for players to feel they are contributing to a gaming experience with different mediums?**

*Framing* I don't know if you know what a hybrid game is? [Explain concept: an analog part and a digital part combined, e.g., a board game using an app]. Have you ever played this type of game?

- *If yes* Can you talk a bit about that? Did you feel there was continuity in the experience between the analog and digital parts?
- Now, imagine we had a game where some sessions were almost exclusively analog, and others were almost exclusively digital. How do you see such an experience being continuous across sessions?

- Have you had any experience that comes close to this?
- What about new games that featured both?

*Hypothetical Scenario:* Imagine that you and a group of friends are playing a scenario in a board game where each of you controls a character and must defeat monsters, but some monsters manage to escape. Players have the possibility to defeat the monsters that escaped through a digital game session to earn extra rewards, such as cards with new abilities or new scenarios, which will affect the next time you play the board game.

- Of the elements you mentioned earlier regarding continuous experiences, do you feel any applied to this type of hybrid game? Which ones? Why?
- Can you see any other factor between the analog part and the digital part that would give you that feeling?
- Any other comments or questions?



## Appendix C

# Second Study - Informed Consent

- 1. I read and understood the information associated with the study.
- 2. I understand that my participation is voluntary and that I am free to withdraw from the study at any time.
- 3. I understand that all data collected during the study will be kept anonymous, if it gets published. I authorize that team members have access and analyze this data.
- 4. I agree to participate in the three phases of the study, which includes playing a game prototype with my group, filling a set of questionnaires, and participating in a group interview. I acknowledge that in-person sessions will be moderated and observed by one or two researchers.
- 5. I authorize the interview (audio) to be recorded and later analyzed.  
*Note: Any sensitive/personal data resulting from the session will be handled confidentially.  
The use of a camera during the remote session is optional.*
- 6. I would like the final report of the study to be sent to my email. (optional)
- 7. I agree to participate in this study.

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_



## Appendix D

# Second Study - Demographics Questionnaire and Gaming Habits

Name (first and last): \_\_\_\_\_

E-mail: \_\_\_\_\_

Age: \_\_\_\_\_

**How frequently do you play board games?**

- Less than once a month
- At least once a month
- At least once a week
- Everyday or almost everyday

**On average, how long are your play sessions?**

- Less than an hour
- One to two hours
- Two to four hours
- More than four hours

**How frequently do you play board games with your partner/group?**

- Less than once a month
- At least once a month
- At least once a week

- Everyday or almost everyday

**How close are you with your group?**

*Stranger (1) — Intimate (5)*

# Appendix E

## Full Card List

Table E.1: Card List

Name	Action Skills	Stunt Action
Synchronized Shields	Attack: 2 (Range 1, Chain), Shells: 2	Spirit: Each <b>other hero</b> within Range 2 gains Shells
Dash	Movement: 3, Quantum reservoir: 1	None
Surge Strike	Attack: 4 (Range 1, Chain)	Lose 1 HP for each Disadvantage you roll
Run	Movement: 2	None
Sturdy Defender	Spirit: 2, Shells: 1	If you've taken damage this round, take <b>both actions</b>
Fight or Flight	Movement: 2, Attack: 2 (Range 1, Chain)	None
Spinning Blades	Attack: 1 (Range 1, Chain, Target 2)	None
Recharge	Focus: 2, Spirit: 2	None
Trinite Slash	Attack: 3 (Range 1, Chain)	None
Desert Descendant	Movement: 2, Attack: 2 (Range 1, Chain)	If you roll <b>4 or more</b> hits in one attack, gain 2 Shells
Swift Foot	Movement: 2	Spirit: Heal 2 HP
Strike	Attack: 2 (Range 1, Chain)	None
Flowing Sequence	Attack: 2 (Range 1, Chain)	Heal 2 HP for each <b>other attack</b> you chain with this one
Honored by Mansiki	Movement: 3, Attack: 2 (Range 1, Chain)	None
Trinite Parry	Movement: 3, Attack: 1 (Range 1, Chain)	When <b>you are attacked</b> by an adjacent enemy, it <b>loses 1</b> HP for each Hit it rolled
Regroup	Movement: 2, Shells: 1	<b>Remove 1 Status</b> from any hero's grid.
Agressive Run	Movement: 3, Dice: 1	None
Nexus Rush	Movement: 3, Quantum reservoir: 2	Remove 1 Status from any hero's grid.
Swords or Sweets	Attack: 3 (Range 1, Chain), Hp: 3	None

Name	Action Skills	Stunt Action
Invigorating Run	Movement: 3, Hp: 2	<b>Instead</b> of healing 2 HP, you may remove <b>1 Status</b> from any hero's grid.
Cautious Advance	Shells: 2, Movement: 2	None
Unbreakable Shield	Shield: 3	None
Dash or Smash	Movement: 4, Attack: 3 (Range 1, Chain)	None
Copy Cat	Quantum reservoir: 1	Copy the action(s) of one hero's <b>unplaced Initiative card</b> .
Bark Orders	Attack: 2 (Range 1, Chain)	You may move each hero 1 Movement
Defend	Movement: 2, Shells: 2	None
Guarded Volley	Attack: 2 (Range 3), Shells: 1	None
Twin Shot	Attack: 2 (Range 3, Target 2)	Spirit x2: +1 Die
Alert Run	Movement: 3, Focus: 1	None
To the rescue	Movement: 3	You and all adjacent heroes heal 1 HP
Deadly Arm	Movement: 2, Attack: 2 (Range 3)	You may make one free Reroll on each Ranged Attack
Fight or Flight	Movement: 1, Attack: 2 (Range 1, Chain)	None
Vindictive Cleave	Attack: 3 (Range 1, Chain)	If this attack targets an enemy that is <b>not at full health</b> , gain Focus
Harpoon Bolt	Attack: 3 (Range 2)	Use one Spirit to gain +2 Range
Mercenary's Eye	Movement: 2, Attack: 2 (Range 2)	When you defeat an enemy, place <b>1 extra reward</b> in its hex
Sparring Partner	Movement: 4, Attack: 3 (Range 1)	Retreat: 2, Disadvantage: Hit
Sparring Partner	Movement: 2, Attack: 3 (Range 3, Target 2)	Retreat: 2, Disadvantage: Hit
Sparring Partner	Movement: 3, Attack: 3 (Range 1)	Retreat: 2, Disadvantage: Hit
Sparring Partner	Movement: 3, Attack: 3 (Range 1, Target all)	Retreat: 2, Disadvantage: Hit
Twirling Blades	Movement: 3, Attack: 3 (Range 1, Target all)	Disadvantage: Flatfooted
Quick as the Wind	Movement: 2, Attack: 2 (Range 2, Target all)	Disadvantage: Focus
With Open Eyes	Movement: 5, Attack: 2 (Range 3, Target all)	Disadvantage: Flatfooted
Partner Fighting	Movement: 3, Attack: 4 (Range 1)	Retreat: 4
Flurry of Fists	Movement: 4, Attack: 3 (Range 1, Target all)	Retreat: 4
Group Defense	Movement: 4, Attack: 4 (Range 2)	Disadvantage: Disarm 1

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<b>Name</b>	<b>Action Skills</b>	<b>Stunt Action</b>
Sparring Partner	Movement: 3, Attack: 3 (Range 1, Target all)	Retreat: 2, Disadvantage: Hit

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## Appendix F

### Full Item List

Table F.1: Full Item List

<b>Name</b>	<b>Description</b>
Meron Fruit	Heal 1 (you or an adjacent hero)
Biorb	You may make a free Reroll for each Attack on this card
Michronic Booster	Move 1 Shell to your Shield
Tusk Liquor	Gain 1 Focus
Hookberry Juice	Move 1 or add 1 to a Movement action
Sharpening Oil	Each Attack on this card gains 1 bonus Dice
Kufi Seeds	Move 1 Shell to your Quantum Reservoir
Bottled Fumes	Each Attack on this card gains Disadvantage
Guravi Nectar	Each attack on this card has 3 range, replacing any previous range but loses Chain
Cozin Powder	Each Attack on this card gains +1 Target, but loses Chain
Smoothie	Gain 1 Spirit