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**FROM SOLVING USABILITY PROBLEMS
TOWARDS EXPERIENCE-DRIVEN
DESIGN IN MOBILE GAMES**

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ABSTRACT

Kseniia Tarasova: From Solving Usability Problems Towards Experience-driven Design in Mobile Games.

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Affected by Apple's data tracking privacy changes and macroeconomic turbulence, the mobile games industry is facing a fundamental shift from the previously dominating free-to-play business model to subscription-based games. The success of subscription games relies on providing an outstanding user experience to the players. The present research describes the process of improving the existing mobile game to cater to the needs of players in a subscription model.

Experience-driven design is one of the methodologies in the human-computer interaction discipline, emphasizing the importance of the user's intended experience and using it to guide the design process. This research aims to transfer the experience-driven design approach to the context of mobile games and provide user experience designers with clear starting points and guidance for setting experience goals.

The present study describes an experiment of setting immersion and approachability as leading experience goals for guiding the improvement process of the existing game. The inspiration for the experience goals was derived from player motivations based on the previous audience study, secondary analysis of the existing internal and player feedback, game reviews, primary analysis of the usability evaluation findings, and accessibility evaluation of the game.

For experience goal evaluation, the design of the in-game dialogue feature was refined with immersion and approachability in mind. Comparative prototype testing featuring a playtest and post-test interviews were used to evaluate the renewed feature design with four participants. The initial comparative prototype testing findings helped identify a sense of control as an additional feature-specific goal critical to the experience of the game's narrative during the first minutes of gameplay.

These findings suggest that further experience goal evaluation must include later phases of the player journey, such as scaffolding and endgame, to examine how the experience goals evolve over time. The initial comparative prototype testing allowed to prepare a groundwork for the experience goal evaluation that will be performed outside of the scope of this research due to the production delay.

In the big picture, the research on experience-driven design in mobile games enhances understanding of user experience and supports the creation of innovative design strategies for engaging, enjoyable, and meaningful experiences for the players.

Keywords: Experience-driven design, user experience, user experience design, usability, player experience, playability, mobile games, user experience evaluation, experience goals, game accessibility.

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

PREFACE

I am immensely grateful to my thesis supervisor, Kirsikka Kaipainen, and the entire Human-Technology Interaction program at Tampere University for their unwavering support and guidance throughout my studies. I especially want to thank my team and research participants for contributing to this work, and my loved ones, whose encouragement has been invaluable at every step of my academic journey.

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LIST OF SYMBOLS AND ABBREVIATIONS

ATT	Apple Tracking Transparency
CEO	Chief Executive Officer
COVID-19	Coronavirus Disease 2019
CUE-Model	Components of The User Experience Model
iOS	iPhone Operating System
IP	Intellectual Property
ISO	International Organization for Standardization
KPI	Key Performance Indicators
NFT	Non-fungible Token
P(n)	Participant (Number)
PC	Personal Computer
PLUX	Path Of the Long-term User Experience
RPG	Role-playing Game
RQ	Research Question
SKAdNetwork	StoreKit AdNetwork
SUS	System Usability Scale
TV	Television
UI	User Interface
UX	User Experience
XAG	Xbox Accessibility Guidelines

1. INTRODUCTION

Mobile games are one of the fastest-growing segments of the video games industry. In 2022 mobile games largely focusing on the free-to-play business model generated 50% of total games industry revenue. Free-to-play games allow players to download and play the game free of charge while access to additional content or cosmetic items such as stickers, power-ups, character, and weapon skins require players to make a purchase or watch an ad. After years of record-breaking performance and COVID-19 lockdown-fueled growth mobile games' revenues dropped -6.4% to \$92.2 billion in 2022 (Elliott et al, 2022).

Several factors contributed to this change. The unprecedented growth during the pandemic was unsustainable. Data privacy regulations by app ecosystems, Apple's App Store and Google Play affected game companies' ability to acquire users cost-effectively. On the global macroeconomic level inflation started to limit players spending ability on mobile games (Elliott et al, 2022).

Previously, mobile game companies used to target potential spenders, players who will likely make in-app purchases in games, and to compete with other advertisers in bidding auctions. The launch of Apple Tracking Transparency (ATT) and SKAdNetwork 2.0 made it difficult for app publishers to track players across apps (Elliott et al, 2022). ATT allowed players to opt out of personal data collection of contact, financial information, location, browsing and search history, purchasing information and other data that could be used for targeted advertising or advertising analytics (Apple Inc.). Running profitable user acquisition campaigns and use of other metrics-based strategies became a huge challenge. The measurement of the advertising campaign's success with limited data access became ineffective. One of the largest mobile game companies, Zynga, acknowledged that the introduction of ATT has increased the company's user acquisition costs and forced to downscale the advertising budgets (Bevan, 2021).

Along with the negative economic effects of the pandemic a war in Ukraine affected mobile game companies as well. Supercell's CEO Ilkka Paananen pointed out that removal of games from Russian and Belarusian markets as part of sanctions issued by European Union and Western countries due to a war in Ukraine has impacted company's financials in 2022 (Paananen, 2023).

The free-to-play business model was about to get a major competitor that was predicted to become the long-awaited disruption of the game business (Saloranta et al, 2022). Play-to-earn is a novel business model in which players are rewarded with non-fungible tokens (NFTs) for playing and progressing in a game. According to Newzoo's 2022 trend report, the NFT and blockchain games performed spectacularly in 2021, demonstrating explosive growth. Nonetheless fears of global recession caused by the war in Ukraine, recent pandemic, and a drawback in the cryptocurrency market curbed the interest of the public and investors in pay-to-earn games (Newzoo, 2022).

Despite the challenges competing for the audience's attention and downloads with free-to-play games remains a struggle. In the press release for a new subscription service Apple argues that critically acclaimed premium games beloved by their players can only reach a small portion of the audience (Apple Inc., 2019). Compared to premium games that ask to pay for the game upfront, free to play games are available to anyone and rely on a smaller portion of high spenders bringing in most of the revenue.

In 2019 Apple launched Apple Arcade, “the world’s first game subscription service for mobile, desktop, and the living room” (Apple Inc., 2019). Apple Arcade is a collection of handpicked exclusive mobile games from famous game creators with no advertisement and in-app purchases. A monthly subscription grants players unlimited access to the entire game portfolio, all features, content, and future game updates.

In a new subscription model, game developers and app ecosystems team up and work closely together. Apple funds game studios to develop games for the Arcade (Sun, 2019).

Apple Arcade set a few significant trends by moving away from the free-to-play model that other entertainment companies picked up afterward:

- Unlimited access to recognizable high-quality games.
- Eliminating ads and in-app purchases from the game experience.
- Gaming as a family-friendly experience respecting players' privacy.
- Play the same game across multiple devices (mobile, tablet, TV, PC).

In the same year, Google introduced its own game streaming service Stadia following a different approach. Google Stadia's value proposition was based on a solid technological foundation leveraging years of research at Google (Harrison,2019). Stadia was a cloud gaming platform allowing streaming games across various devices on a high-speed

connection, providing instant feedback like running a locally installed game without a console. Stadia was rumored to become a “Netflix for games,” a subscription-based game catalog for mobile, TV, and PC. However, the pool of subscription games was limited. Players often had to buy games on Stadia the same way and for the same price as on PlayStation Network, Xbox Live, and Steam (Sun, 2019). In 2022 Google announced Stadia’s shutdown and the start of the refund process for all games. Officially the reason for discontinuing the development of Stadia was an inability to reach the expected traction with users (Harrison, 2022).

Netflix joined the trend for the mobile games subscription services in 2021 by announcing the launch of Netflix Games for its members. Netflix subscription works as an all-access pass to the Netflix Games portfolio that has no ads, additional fees, or in-app purchases (Verdu, 2021). A year later Sony PlayStation opened a mobile game division and acquired a Finnish mobile game studio Savage Games that focuses on mobile live service games. The new mobile game division operates independently from console development but shares the existing PlayStation IPs (Hulst, 2022).

The subscription model is an alternative to pay-to-play, reducing the player’s pain of paying for the game upfront. Compared to free-to-play games, it allows access to higher quality games catered for immersion and engagement rather than for aggressive monetization.

Apple features originality, quality, fun, and appeal to players as the criteria for the curated game selection to the Arcade platform (Apple Inc., 2019). These criteria can be translated into player retention, behavior, and engagement metrics. Retention refers to the percentage of players returning to the game during a defined period after the initial install (typically measured at 1, 3, 7, 14, and 30 days) (Frid, 2020). High retention rate and a smooth retention curve indicate that a game provides value to players and an incentive for coming back to the game repeatedly (Frid, 2020).

Behavior and engagement metrics allow to get insight into how players interact with the game, how often they play it, for how long, and what factors affect a player’s decision to quit or uninstall the game. Typical engagement metrics include session number and length, game load time, crash, and churn rates (AppLovin, 2022).

In other words, metrics that measure player experience are now at the forefront of designing subscription games whereas free-to-play game key performance indicators (KPI) are more revenue centered. This is a fundamental change. To achieve their business goals, developers of subscription games must focus on providing an outstanding player experience first.

It creates an inherent need for understanding players' expectations, what they enjoy the most and dislike about the game. Game developers need to learn effective strategies for collecting insights about player experience beyond quantitative metrics to stay competitive. Qualitative research methods can enrich the input of game analytics data and provide ideas on how to improve players' user experience.

Experience-driven design is one of the methodologies in human-computer interaction discipline that emphasizes the importance of the user's intended experience and sets it as a guiding light throughout the design process. In experience-driven design, the user's intended experience is expressed as an experience goal. Designers address these goals by creating designs aiming to evoke the intended experiences and by selecting suitable methods of measuring if the experience goal was reached.

Experience-driven design methodology was successfully applied to more traditional fields such as office building elevator management, metal, and maritime industries (Kaasinen et al., 2015). However, little research was dedicated to experience-driven design in mobile games. I decided to use it as an opportunity to fill in the gap by conducting research focusing on applying the experience-driven design methodology to re-design process of the mobile game.

In this thesis I will address the following research questions:

- **RQ 1:** How can experience goals be set and evaluated in the context of mobile games?
- **RQ 2:** How can experience goals guide the user experience improvement and re-design work?
- **RQ 3:** What are the practical guidelines for experience-driven design in mobile games?

The main purpose of this research is to provide user experience designers working on mobile games and other interactive media products with clear starting points and guidance on how to apply the experience-driven methodology to the creative industry.

Overall, the present thesis consists of six chapters. Chapter two outlines the theoretical basis behind the experience-driven design approach, sets clear definitions for user experience and usability, and describes current user experience evaluation methods used in the mobile games industry. The following chapter introduces the research context and explains the underlying rationale behind choosing the experience-driven design framework for the mobile game re-design task. Chapter four describes the sources of inspiration for setting the experience goals for this research and the methods used for collecting

and analyzing the data. Finally, the last two chapters focus on the research findings, learnings and generalized practical guidance formulated based on the research work, discussion on the next round of design and evaluation of the dialogues feature, and on limitations that have affected the research process.

2. THEORETICAL BACKGROUND

The following chapter discusses the differences in definitions between user, gaming and player experience, playability, and usability, outlines various experience models, explains the experience-driven design approach, and describes the user experience evaluation methods currently used in the mobile games industry.

2.1 User experience and usability in mobile games

User experience is a study subject of multiple heterogeneous disciplines, including psychology, anthropology, philosophy, computer science, engineering, design, and game research (Berni & Borgianni, 2021). Creating a unified unambiguous definition of user experience is problematic due to slightly different interpretations of terms such as “emotion” or “context” that vary depending on the research field. Difficulty in quantifying affective, hedonic, and aesthetic aspects of user experience objectively and lack of empirical research pose additional challenges in defining user experience (Berni & Borgianni, 2021; Hassenzahl & Tractinsky, 2006). However, the researchers turn to the international standard on ergonomics of human-system interaction, ISO 9241-210, as the source of several central aspects that recur in most user experience interpretations.

According to the ISO 9241-210 standard, user experience refers to “a person's perceptions and responses resulting from the use and/or anticipated use of a product, system, or service” (International Organization for Standardization, 2010). User experience is a result of interaction in a particular context of use between the user and the product that encompasses the user's subjective emotions, beliefs, behaviors, physical and psychological responses as well as the product's brand image, presentation, functionality, system performance, interactive behavior, and assistive capabilities.

The research interest in user experience in mobile games became more prominent when mobile devices such as smartphones and tablets transformed into a gaming platform of choice for a broad user base of smartphone owners (Engl & Nacke, 2013). Mobile games have previously existed on cellular phones as well. However, conventional modern mobile games with high-fidelity graphics, whimsical characters, and touchscreen interactions, such as *Angry Birds*, appeared in the late 2010s.

The study of user experience design and evaluation in mobile games has become crucial in game research field. Consequently, alternative definitions of user experience emphasizing specific aspects relevant to the context of mobile games started to emerge.

Moizer et al. (2019) used the concept of gaming experience to evaluate the user experience of serious games. The gaming experience is a one-to-one relationship between players and games comprising of flow, immersion, affect, challenge, and skills development (Moizer et al., 2019). Engl and Nacke (2013) defined player experience as an experience that emerges from players' interaction with the game system, as part of the mobile gameplay experience model.

Both gaming and player experiences emerge from the interaction between a player (user) and a game (product). Conceptually, the definitions of gaming and player experience are consistent with the interpretation of user experience in the ISO 9241-210 standard. Furthermore, specific gaming-related experiences such as flow, immersion, affect, challenge, and skill development make the concept of user experience in games more tangible.

Playability is another widely used concept in game research applied in the quality evaluation of mobile games. Similarly to the user experience definition, playability is missing a single officially acknowledged interpretation. Sánchez and colleagues (2009) define playability as "the degree to which specific users can achieve certain goals with effectiveness, efficiency and especially satisfaction and fun in a playable context of use". Aside from specifying "fun" and "playable context of use", this definition of playability is identical to how usability is expressed in the ergonomics of human-system interaction ISO 9241-210 standard: "Usability is the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". Korhonen (2016) explains playability as a synthesis of an intuitive user interface, an unobtrusive gaming platform, and understandable, suitably difficult, and engaging gameplay. According to the abovementioned definitions, playability combines the core aspects of usability in the context of games and expands further to specify the gameplay requirements.

Usability in games concerns clarity of visual and audio communication, accessibility of the game, navigation, ease of use, user interface readability and design, feedback provided to players, onboarding, and how players control the game. Gameplay refers to game mechanics such as goals, challenges, rewards, difficulty progression, narrative, and the way the game is played (Macmillan Dictionary, n.d.; Paavilainen et al., 2018).

The present research is conducted from the point of view of a user experience designer working in the mobile games industry. Hence, the core research interests are the user experience of mobile game players and the effects of game usability on user experience leaving aside the in-depth analysis of the gameplay aspects of mobile games.

To summarize, the discussion on the definition of user experience, usability, and playability highlights several key points:

- The user's (player's) perception is at the core of any user experience, including the experience of mobile games. The perception is dynamic and might evolve while using the product (game) or even before interacting with it.
- The perception is affected by the user's (player's) subjective emotions, beliefs, previous experiences, behaviors, physical and psychological states in a moment of interaction.
- The situation or the context in which the user experience occurs plays a significant role in experience perception.
- The user's (player's) emotions are as crucial elements of user experience as the product's (game's) features and qualities.
- Several game-related experiences include flow, immersion, affect, challenge, and skill development.
- Playability aims to set quality standards for mobile games in terms of usability and gameplay.

2.2 User experience models

In addition to the ISO definition of the user experience, researchers in the field of human-computer interaction have developed several user experience models (UX models). Those models enable the scientific community to align thinking and create shared practices for designing and evaluating user experience. Most importantly, the UX models help to define the components of user experience, determine factors affecting it, and allow user experience designers to apply this knowledge to design practice.

Mahlke and Thüring (2007) proposed a model that corrects the usability skewed interpretation of user experience by highlighting the importance of aesthetics and emotional experiences on the perceived quality of a system's use. Components of the user experience model (CUE-Model) distinguishes three main components of user experience: instrumental qualities, non-instrumental qualities, and emotional responses. Instrumental qualities deal with the system's usability, usefulness, effectiveness of task performance

and ease of use. Non-instrumental qualities focus on the look and feel of the system, its appeal, and its attractiveness. Both qualities influence the emotional response to the user's interaction and the overall impression of the system.

Hassenzahl's hedonic/pragmatic model of UX echoes the ideas CUE-Model (Law et al., 2007). Similarly to instrumental and non-instrumental qualities, users perceive the product's pragmatic and hedonic attributes as linked with performing specific tasks (do-goals) and fulfilling psychological needs (be-goals). Pragmatic aspects of products focus on utility and usability. Hassenzahl highlights stimulation (novelty and change, personal growth), identification (communication of identity to relevant others, relatedness), and evocation (provoking memories, symbolizing) as key hedonic attributes of a product.

The novelty of Hassenzahl's UX model is in emphasizing the difference between the user's and designer's perspectives and directing attention to the practical aspects of experience design. According to hedonic/pragmatic model, designers express the intended product character via pragmatic and hedonic attributes throughout features, content, presentation, and interaction design. The users perceive and interact with the apparent product shaped by the surrounding environment, the situation of interaction, users' emotions, moods, and previous experiences.

Throughout usability studies, Hassenzahl noticed that hedonic and pragmatic perceptions change over time. The initial hedonic perceptions decrease, and the pragmatic ones increase. Karapanos et al. (2009), Kujala et al. (2013), Karahanoğlu and Bakırlioğlu (2022) examined deeper the temporal aspects of user experience and its dynamic nature and developed practical recommendations for UX designers.

In a longitudinal diary study with the first iPhone users, Karapanos and colleagues (2009) demonstrated that time is a significant factor influencing users' experience and evaluation of products. Over the phases of product adoption, a shift happens in the perception of what aspects of user experience are the most significant.

During the initial orientation, stimulation (hedonic) and learnability (pragmatic) were reported as the dominant qualities. Incorporation of the product into the daily routines shifted the focus to usefulness and long-term usability (pragmatic). In the identification phase, the users form a stronger emotional attachment to the product that becomes part of their personal and social experiences (hedonic) (Karapanos et al., 2009). The study supports Hassenzahl's idea of demising the relevance of hedonic qualities after the initial experience with the product. However, their role remains significant in the long term. Furthermore, the study suggests that the experience with the product had a more compelling influence on user experience than the product expectations.

Karahanoğlu and Bakırlioğlu (2022) argue that prior experience with other interactive products and users' commitment affect users' expectations of a new product. The authors proposed the Path of the long-term user experience (PLUX) model, an ideation tool for designing long-term user experiences considering the product and human-related qualities. The stages of the PLUX model include:

- Before acquiring – users' perception of the new product is strongly affected by the qualities of the previously used products, and unfamiliar qualities might be perceived negatively.
- Learning – linked with exploring the product, figuring out what needs the product satisfies, and adapting to a new product.
- Mastery – a defining stage when a user decides to integrate the product into own life or stop using it.
- Post-mastery – product usage becomes an integral part of users' life for an extended period (Karahanoğlu & Bakırlioğlu, 2022).

In the domain of gamification, there is a similar framework to the PLUX model specifying the phases of the player's journey and player motivations defined for each step of the journey. Chou describes the following phases of the player's journey in the Octalysis model:

- Discovery – at this stage, the player's motivation is to explore and try the experience.
- Onboarding – players learn the rules and tools required to play the game in this phase.
- Scaffolding – connected with repeated actions of players towards achieving a specific goal.
- Endgame – concerns with retaining players' motivation to keep playing the game (Chou, 2015).

According to previously described UX models, the user experience can be divided into several components that deal with the utility and usability of the product (instrumental or pragmatic qualities), aesthetics and appeal (non-instrumental or hedonic qualities), and users' emotional experiences towards the product. The influence of instrumental and non-instrumental qualities on a user's emotional responses varies depending on the user experience phase. Non-instrumental qualities are more influential during the initial user experience (before acquiring/discovery) with the product. During day-to-day interactions

(learning/onboarding), the relevance of non-instrumental qualities fades, and instrumental qualities become more important. However, non-instrumental qualities are crucial in forming a strong emotional attachment with the product long-term and in retaining the users (mastery, post-mastery/scaffolding, endgame).

Additionally, temporal UX models emphasize the fact that users' goals, needs, motivations, and hence user experience change and evolve over the period of using the product and even while anticipating its use.

UX models provide a robust theoretical foundation for practical work designing for user experience. However, there is still a need to create more precise step-by-step design instructions that can be applied in the industry.

2.3 Experience-driven design

Although human-computer interaction researchers are trying to create practical guidelines for UX designers with the help of novel UX models, it remains challenging to translate abstract recommendations into step-by-step instructions with a clear starting point.

Design of the intended product character or the intended experience is the primary goal of UX designers according to the hedonic/pragmatic model (Hassenzahl, 2007).

The work of Kaasinen et al. suggests that the design process should begin with setting clear experience goals that specify the intended experience, can be measured (Väättäjä et al., 2015), and ensure the design focus throughout the complex, often multidisciplinary product development. Hence, the primary objective of an experience-driven design approach is to use the intended experience for guiding design decisions.

Hassenzahl (2007) poses a question if it is possible to design emotions if they are considered a design goal. He concludes that rather than attempting to design the emotion itself, which is subjective in nature, situation dependent, and often beyond the designer's control, the designers should strive to create a setting that would help evoke a particular emotion in users. Neither emotion nor experience can be forced on people and design it for them. However, designers can facilitate a specific type of experience through pragmatic and hedonic product qualities and collect user feedback on the accuracy of the experience goals (Kaasinen et al., 2015).

Lu and Roto (2015) state: "Experience goals reflect the intended momentary emotion or the emotional relationship/bond that a person has with the designed product or service." There is an argument about the opposing relationship between usability and experience goals (Lu, 2018; Kaasinen et al., 2015). Usability goals aim to reduce negative

experiences and focus on how useful and productive the system is, while experience goals elevate and underline specific positive experiences of users interacting with products. This separation might result from overemphasizing the pragmatic aspects of designing interactive products in the past. However, not considering usability goals as part of the intended experience might backfire and create unwanted obstacles to reaching the intended positive experiences (Kaasinen et al., 2015).

If the experience goal is the starting point for design, where can these goals be derived from? Kaasinen et al. (2015) proposed an experience goal-setting framework using Brand, Theory, Empathy, Technology, and Vision as inspiration for establishing UX goals.

- Brand-based UX goals aim to reflect company brand promise in designing products.
- Theory-based experience goals use existing literature, theoretical frameworks, and research results as inspiration.
- Empathy-based experience goals rely on the designer's skill in creating an understanding of users' needs and feelings and ability to find design inspiration for user experience while engaging with users directly, interviewing or observing their behavior.
- Technology-based UX goals focus on possibilities provided by novel technologies and ideas for overcoming possible negative experiences caused by them.
- Vision-based experience goals aim to renew and help create a desirable future product vision often inspired by other advanced and futuristic fields. product vision that is often inspired by other advanced and futuristic fields.

All five approaches allow using various sources of experience goal inspiration considering multiple points of view. Theory and empathy-based goals focus more on users' perspective, while brand, technology, and vision-based goals search for inspiration in the product and company identity (Kaasinen et al., 2015).

The process of setting up experience goals can be divided into the following steps:

1. Review and analyze literature and earlier studies to create an understanding of users' problems if possible.
2. Use observation, contextual inquiry, and other user research methods to learn about users' context of use, current interaction patterns, and user journey.
3. Identify a small set of initial high-level experience goals based on the previously acquired insights.

4. Use an iterative design approach to create solutions and new concepts with the experience goals in mind.
5. Formulate measurable UX targets that can be used in further evaluation of a new solution or concept.
6. Refine the solution or concept and evaluate it with the users measuring how well the selected UX targets are reached (via workshops, interviews, prototype testing, and observation).
7. Iterate on the solution until the design goes in the right direction and meets the experience goals. Implement the solution and observe the users' responses.

Kaasinen et al. (2015) stress that experience goals must be set in collaboration with other organizational departments and consider other goals, such as a company's business objectives. The newly selected experience goals should be compatible with usability goals, accessibility principles, and industry quality standards.

The described approach was successfully used to set up user experience goals in various industrial work environments. The studies were conducted for experience with mobility using elevators in office buildings, loading stations, electronic overhead traveling (EOT) crane operation in the metal industry, and remote operation of semi-automated harbor container cranes (Kaasinen et al., 2015). The experience goals in these traditional industrial settings were focused on users' emotions and psychological needs, for example, avoiding anxiety, the feeling of control, and support of competence. Transferring this approach to the mobile games industry is an intriguing experiment that can reveal opportunities and challenges of leveraging experience goals in the creative industry.

2.4 User experience evaluation methods in mobile games

The free-to-play business model strongly influences user experience design and evaluation methods in mobile games. Mobile game developers focus heavily on refining and perfecting the player's first-time user experience, which occurs when the player launches the game for the first time after the download, compared to user experience in later stages of the game. The effort on optimization of the player's user experience throughout the product lifecycle in free-to-play games needs to be more balanced.

Besides the game production costs, the profit model of free-to-play games requires substantial investment in advertising and user acquisition. Free-to-play games must create a steady stream of new players downloading the game and ensure that they are retained for as long as they make an in-app purchase or watch an ad in the game. The first-time user experience is a critical phase that aims to convince the players that the game is worth their time and monetary investment. Reaching profitability is only possible if

players continue playing past the onboarding phase and keep active and engaged with the game (Petersen et al., 2017).

Development time and iteration cycles in free-to-play mobile games are much shorter than in computer and console games due to high user acquisition costs and delayed return on investment. Therefore, mobile game studios that evaluate players' experience with games prefer lean user experience and usability evaluation methods, such as surveys, heuristic evaluation, and remote unsupervised playtesting. Often, user experience evaluation is considered optional and not included as a separate step in the production process.

Typically, game user researchers employ two categories of evaluation methods: self-reported or subjective methods and objective methods that rely on physiological measurements (Yu et al., 2018).

The first category, subjective methods, refers to users' self-reported evaluation of different aspects of the game and their personal feelings in verbal or written form, for example, interviews, standard questionnaires, or surveys. (Yu et al., 2018).

The second category, objective methods, measures the user's physiological signals such as heart-rate variability, galvanic skin conductance, respiration, pupil dilation, eye-tracking, facial expressions, and brain wave reading while playing (Yu et al., 2018). Measurement of such signals requires extensive knowledge and research expertise, special tools, and a controlled setting for conducting the experiments. Unlike in console and computer game companies that might have in-house user research department and a dedicated lab for collecting and analyzing players' physiological data, in mobile games use of physiological evaluation methods has not been a standard industry practice (Petersen et al., 2017).

On the other hand, mobile game developers have widely adopted game analytics data collection. The game analytics data consists of aggregated player behavior measurements such as retention rate, session length, time spent on different features, churn rate, and other metrics that can be used as a substitute for objective evaluation methods in mobile games. Whenever the retention rate falls below a set benchmark, it might signal a problem negatively impacting players' user experience.

However, game analytics data are numbers and rates unable to explain the reason for underlying problems or describe the user experience. For that purpose, subjective and other qualitative evaluation methods are used along with quantitative game data.

Observation during the playtest session is a commonly used method for quality control and spotting usability problems in the mobile games industry. The COVID-19 pandemic

accelerated the shift towards remote unsupervised playtesting. Specifically tailored for mobile games, Playtest Cloud is one of the biggest platforms for conducting playtests and finding test participants (Playtest Cloud n.d.). The platform links game developers and playtesters via an app that allows game build uploading, video capture of a gameplay, visible touch indication when players tap on the screen, and voice recording of players' following think-aloud protocol. Testing games in a more comfortable environment close to the natural gameplay experience is one of the most significant advantages of remote unsupervised playtesting.

After a playtest session, game developers can provide the testers with a questionnaire or schedule a separate interview. Peters et al. (2017) emphasize that questionnaires are a supplementing evaluation method to playtest observation.

Questionnaires or interview data can be collected before, during, or after a play session. Self-reported data is often criticized for being subjective, requiring participants to recall rather than describe their experiences in a moment, and being prone to cognitive biases (Petersen et al., 2017).

Nonetheless, quotes and subjective user experiences of players provide hints to their perceptions of the game. The recall problem can be remedied by showing participants snippets of gameplay recorded during the playtest in the interview or as part of the questionnaire (Petersen et al., 2017).

Experience graph is another method that allows test participants to report their experience as a drawing after interacting with the game and describe the graph afterward (Petersen et al., 2017).

Expert or heuristic evaluation is another category of evaluation methods besides subjective and objective methods. In heuristic evaluation method, an expert uses a set of "rules of thumb," heuristics, to evaluate the game rather than the user experience. This method allows to pinpoint potential problems that players might experience while interacting with the game. Commonly, experts use usability heuristics for product evaluation. Korhonen and Koivisto proposed a set of mobile game-specific playability heuristics divided into four categories: Game Usability, Game Mobility, Game Play, and Multi-Player (Korhonen & Koivisto, 2007).

All user experience evaluation methods mentioned above provide the most impactful results whenever they are applied together and can complement each other. The user experience of mobile free-to-play game players was commonly evaluated with the following combination of methods (Petersen et al., 2017; Yu et al., 2018):

- Game analytics data of the first-time user experience funnel and other metrics.
- Playtest observation of first-time user experience and post-test questionnaire.
- Interviews and surveys enhanced with stimulated recall and experience graph methods.

The transition to a subscription model in mobile games removes many time-related production and cost constraints of free-to-play. It emphasizes elevating the player's user experience throughout the game's lifetime. Mobile game industry professionals need higher precision methods and tools to acquire richer insights into how players experience the game to successfully design for and improve players' user experience and ensure a long-lasting relationship between players and the game.

UX designers in subscription games are interested in how players' user experience develops over time. There is a need to use other methods for capturing the UX beyond momentary and episodic experiences. Such evaluation methods as diaries, questionnaires, experience sampling, and repertory grid techniques can be utilized for evaluating long-term user experience with mobile games. In my research, I initially focused on the first-time user experience of the players, for example, when conducting a usability study. However, when I pivoted to an experience-driven design approach, I realized that evaluation of experience goal fulfillment requires a substantial understanding of how the players' experience and players' needs develop over time while progressing further in the game. Hence, for experience goals evaluation, I decided to use a combination of longitudinal user research methods such as diary studies, playtests, and post-test interviews with video snippets from the playtest to accommodate easier recall of the experience during the test.

3. RESEARCH CONTEXT

The work on present research on players' user experience in the mobile game was set in motion by a need to discover the reasons behind the irregular retention metrics during the first day of playing. The quantitative game analytics data required additional insights into what players do in the game during the first hours after the download and how they experience the game. The usability study findings I have gathered echoed the existing internal feedback and player notions about the game from game reviews and social media. Altogether, the combined quantitative and qualitative data and freshly obtained usability study results uncovered a clear need to change and improve the players' user experience in the game. The original task of detecting and solving potential usability problems transformed into a larger scope of redesigning the game by setting the experience design goals. In the following chapter, I will provide more details about the game I worked on and about selecting an experience-driven design approach as a leading theoretical framework for the redesign.

3.1. The product description

In the present research, the product is a mobile game that belongs to a universe of well-known television program. Although familiar characters are present, the game explores unrelated fictional what-if scenarios outside the main storyline.

The players' goal is to build a versatile collection of characters to assemble a dream team that can defeat even the toughest enemies in various game modes.

Players enter the game along with the characters and face enemies terrorizing the game world. Enemies can be attacked by matching three or more objects in a row on a game board or using special character ability. Players have full control over the team of characters that can challenge the enemies in a battle.

Successful mission completion grants valuable resources that can be used to strengthen the characters by upgrading them to the next level.

Players are gently guided through a narrative to explore the distinct locations of the game and get introduced to new characters and enemies. The narrative is split into stories that contain multiple missions. Players have limited interactions with the narrative through dialogues between the characters and cutscenes.

Although the game is designed for the possibility of not having sounds on, the existing sound effects and music set the mood and aim to immerse players into the game.

The mobile game uses touch-based interactions such as tapping and swiping. The game can be played on smartphones as well as on tablets.

3.2. Research process and approach

The primary focus of this research is the application of the experience-driven design framework to the process of improving the existing product, a mobile game. In the case studies on using the experience-driven design approach in industrial workspace environments, the key novelty was obtaining the user experience perspective in industrial work and creating the experience goals for warehouse workers and crane operators from the ground up (Kaasinen et al., 2015). Meantime, the novelty of my research was in applying experience-driven design in the context of the creative industry, mobile games, and using the framework to iterate on the experience design goals based on the feedback provided by the players and development team.

I joined the game team as a junior UX designer when the game was feature complete. One of my main responsibilities was conducting a formative evaluation of the game's performance by collecting and analyzing internal feedback from the game team and game studio's employees.

Internal feedback was one of many sources of information about the player's user experience with the game. AppStore and Google Play reviews and feedback from the player community were gathered and assessed regularly.

The team started picking up irregular early retention signals in some regions. However, it took time to determine the reason for it. I suggested conducting a usability evaluation study that could help the team better understand what happens in the game on each step of the first-time user experience funnel and how players interact with the game throughout the onboarding phase. Along with qualitative data, the team used game analytics to monitor the quantitative metrics, such as retention rate, and observe the first-time user experience funnel.

The usability study findings highlighted several issues that could affect players' user experience on a larger scale during the first interaction with the game. Those issues were grouped into the game's technical performance, gameplay, user experience, and visual communication.

The intensity of signals about the issues with user experience emerging from the usability evaluation study, internal and player feedback started to reach a critical point and required action. Those signals indicated an apparent demand for change and improvement. However, due to the substantial scope of features influenced by the issues, it was unclear where and how to start the improvement process.

At that point, I got familiar with the experience-driven design approach and experience goals through a university course. The experience-driven design uses the intended user experience as the starting point for generating new solutions and as a guide throughout the design process. In our project, we have accumulated enough data on what works and does not work in the game. I drafted a proposal combining the feedback data, previous usability studies, and the existing audience research to use it as an inspiration for setting the experience goals for the game that would set the direction for the improvement work.

The proposal got approved, and I started working as a workshop facilitator with a multidisciplinary team of product managers, programmers, game designers, user interface (UI), and technical artists to formulate the current core problems and new experience goals for the game.

This work resulted in the team identifying immersion, approachability, and action as the new experience goals.

In the following chapters, I will explain the previous research methods that led to selecting an experience-driven approach, such as usability studies and accessibility evaluation, workshop methodology for experience goal setting, and a comparative prototype testing for a new visual representation of the narrative in the game.

4. DEVELOPMENT OF EXPERIENCE GOALS

According to the process of setting up the experience goals, the first step is to review and analyze the existing sources of information about the users and their needs. This chapter will examine the previous theoretical background of the game accumulated throughout the game production process (section 4.1), earlier usability evaluation data (section 4.2), accessibility evaluation process (section 4.3), and findings from the experience goal-setting workshops (section 4.4) and finally, describe the procedure and the results of the comparative usability study conducted for the dialogues feature.

4.1 Secondary analysis of previously collected user research data

From the start of the development, the game has accumulated a lot of existing background information that I could use to narrow down the scope of potential experience goals. Out of five sources of experience goal inspirations, I decided to focus primarily on theory and empathy. In the context of my research theory referred to player motivations derived from the earlier audience study, and empathy consists of the analysis of the internal feedback, player store reviews, and community feedback.

The game was created based on the audience user research data conducted several years before I joined the team. As a result, the previously conducted audience research findings were translated into the following player motivations (presented in Table 1) that were reflected in the game:

Table 1. *Target player motivations (Yee, 2016).*

Motivation	Description
Fantasy	Experience the game universe together with the characters.
Community	Be a valuable member of a team.
Completion	Strive to clear all levels, complete all missions, get all collectibles.
Power	Powerful character, powerful equipment.

The player motivations described above could be used to define the intended product that the design team tried to create. However, no attempt has been made to evaluate how well those players' motivations were addressed in the game. To fulfill the identified research gap in my present study, I set the design and validation of the newly created experience goals via user research as the primary research objectives.

Another valuable source of information about the players and their experience was feedback from players on various community platforms and internal feedback from the studio employees who played the game and shared their observations with the development team. The player experience team, leading customer support and community efforts in the company, focused on collecting and processing feedback from the players. I, on the other hand, was responsible for gathering and analyzing the internal feedback.

Both types of feedback were collected systematically in a document that would reflect the feature the feedback belongs to, date of receiving, frequency of occurrence, full description, and proposed follow-up actions.

Individual feedback entries had minimal impact on improving the players' user experience in the game due to a lack of feedback analysis and summarization of the recurring themes. I used the thematic analysis method to identify shared ideas among feedback entries. The feedback provided internally by the studio employees was very granular and often focused on aspects of the game that needed to meet their expectations from a professional point of view or highlighted problems. Such comments would include issues with the user interface, technical debt, user flow, and feature complexity problems. I decided to include player feedback entries in the same analysis to create a complete picture of how the game is perceived by people playing it.

The results of the player community feedback and game reviews analysis highlighted five positive aspects of the game, including a fun twist to the core game mechanics, the absence of ads and in-app purchases, being captivated by the game, the fact that the game is based on a TV program, and anticipation towards the upcoming game updates. Despite positive feedback, players expressed frustrations regarding crashes and lagging behavior of the game, lack of quality-of-life features, and criticism of the game needing to be more original.

The existing data about players, their motivations, and their experiences with the game helped to create a foundation for the new experience goals. The feedback highlighted aspects that work well in the game and excite players, as well as issues that might negatively impact the user experience with the game. Such subjective qualitative data requires additional sources of information to validate the initial findings. Next, I reviewed subjective-objective data from previous usability evaluations to search for common user experience patterns.

4.2. Usability evaluation studies

Usability evaluation studies provided valuable information on how players experience the game while interacting with the tutorial. This section outlines the research scope and questions, usability evaluation procedure, data analysis methods, and research results.

4.2.1 Background and scope

Before starting to define the game's experience goals, I conducted two usability evaluation studies of early gameplay experience from the moment of downloading the game until the end of the tutorial. The first usability evaluation examined the underlying reasons for changes in player retention on the first day of playing. The second evaluation was a follow-up study aimed at revealing how well the identified problems from the first usability study were addressed by the design solutions I proposed.

The initial usability evaluation consisted of primary and secondary research. In secondary research, the team examined the difference between how many players have launched the game and how many have completed the tutorial through game analytics data. This information was combined with qualitative analysis of the previous studies of the first-time user experience, internal feedback, and bug reports occurring during the tutorial to pinpoint the exact moments when players leave the game.

As a UX designer, I was responsible for conducting a usability study as a primary research method to complete the picture of the quantitative evaluation of the first-time user experience with a playtest and post-test questionnaire.

The usability evaluation study aimed to determine the factors creating friction or unpleasant user experiences for the players while learning and interacting with the game for the first time. Since it was the first usability study conducted for this game, it had formative qualities and focused on tackling the following research questions:

1. What is the first-time user experience flow like for the players?
2. What completion paths do players take while progressing through the tutorial?
3. At what point do players get disengaged from the game or lose interest?
4. At what point in the game do players get confused the most or get stuck?
5. When do players ask for more guidance?
6. What parts of the game do players try to skip most frequently?
7. Do players find the tutorial helpful?

To answer those questions, I observed the actual completion paths of the tutorial. I made notes about any actions and behaviors that were different from the intended tutorial flow, especially if players expressed confusion or frustration with the game.

4.2.2 Usability evaluation procedure

The initial usability evaluation consisted of playtesting and a post-test questionnaire. For the playtest, I was interested in recruiting participants without any previous experience with our game. However, I wanted to observe if participants' mobile gaming background would affect how they play through the tutorial in our game.

The playtest was conducted during the COVID-19 pandemic in a remote unmoderated format. I have used a third-party service to recruit the participants, distribute the game build and questionnaire, record the gameplay video and testers' voice comments.

Typically, usability evaluation studies provide participants with a set of tasks to complete during the test. In games, the tutorial consists of a series of tasks that players must complete to get familiar with the game mechanics and successfully progress further in the game. The test participants were only asked to complete the tasks that were offered by the game's tutorial.

The test setup was done through an order form provided by the third-party service. The service used a standard briefing that instructed the participants to install and play the game the way they usually do outside the testing situation.

I set up a 30-minute minimum session length to cover the tutorial. The participants could continue playing past the limit if they preferred to. In the brief, the participants were asked to follow the think-aloud protocol and comment on their actions while playing the game. At the end of the session, participants were required to upload the video and answer the post-test questionnaire.

For the post-test questionnaire, I selected the standard System Usability Scale (SUS) that I adopted to fit the context of a mobile game evaluation (Brooke, 1996). I rephrased some of the questions and removed a question about the need for a technical person to use the system since it seemed irrelevant to this case. The team was concerned if test participants would perceive this question as socially awkward or a bad joke. These changes were reflected in the SUS score calculations during the analysis phase. The points were calculated considering having nine questions instead of ten (Lewis & Sauro, 2017). The test participants were presented with the following statements that they were asked to score on a scale from 1 "Strongly disagree" to 5 "Strongly agree" (presented in Appendix A):

1. I think that I would play this game frequently.
2. I find the game unnecessarily complex.
3. I think the game is easy to play.
4. I find the various functions in this game to be well-integrated.

5. I think there is too much inconsistency in this game.
6. I imagine that most people would learn to play this game quickly.
7. I find the game very awkward to play.
8. I feel confident playing the game.
9. I need to learn a lot of things before I can play this game.

In addition to SUS statements, I added three optional open-ended questions about participants' impressions of the tutorial:

- How satisfied or dissatisfied are you with the tutorial?
- What do you think about the videos that were shown in the game?
- What was your experience like with the character dialogues?

The order form was completed by adding a questionnaire, a target audience description, and the game build. It took about two business days to receive the results.

4.2.3 Participants recruitment

For this test, I have recruited nine participants in total. The participants were recruited from the pool of testers of the third-party service. The service provides compensation directly to the participants after completing the test. For each group, I asked to recruit three participants. In the order form, I specified that the participants should be divided into two groups based on self-reported playing experience, and the third group used unspecified targeting within the same demographics as the previous two groups (described in Table 2). Having three tester groups split by playing experience of different games genre allowed to check if there are differences in user experience for RPG fans and more casual match-3 players.

Table 2. *Participants' profile for the initial usability evaluation.*

	Group 1 – unspecified targeting (n=3)	Group 2 - RPG fans (n=3)	Group 3 - casual players (n=3)
Location	English-speaking countries	English-speaking countries	English-speaking countries
Demographics	Age targeting 18-50+, even gender distribution	Age targeting 18-50+, even gender distribution	Age targeting 18-50+, even gender distribution
Gamer type	All gamer types	Hardcore and mid-core players	Casual players
Competitor games	Competitor games not specified	Specific genres Mobile RPG games, Team RPG games, or Mobile Action RPG games	Specific genres Puzzle RPG games, Interactive Story games, Hybrid Puzzle games, Pure Match-3

			games, or Casual Puzzle games
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4.2.4 Data collection and analysis

The process of game evaluation was performed asynchronously. The usability evaluation participants recorded their gameplay sessions individually in a place and time of their choice. As an evaluator, I received the gameplay videos with visible touch indications and audio recordings of the players' comments. My job was watching the videos and collecting useful insights I could analyze in the next phase.

Since the tutorial was divided into a series of steps, I used the same step order to document the descriptions of tasks, completion time and path, errors, bugs, unintended behaviors, observations of players' actions, and direct quotes. I created a document where I collected this information for all nine test participants.

The SUS answers were collected in a separate document where I calculated the score. However, the lack of statistical significance due to a small sample size prevented me from making useful conclusions for further research.

I examined the data collected from the gameplay videos and open-ended questions. The data that was extracted from the videos included the following:

- Tutorial steps, numbers, and descriptions.
- Start time, end time, and duration of each tutorial step in seconds.
- Records of unusual completion paths for the tutorial tasks.
- Records of errors and unintended behaviors.
- Records of player actions and behaviors during the playtest.
- Direct quotes from the test participants.

I gathered all qualitative data on players' behavior, the direct feedback from the playtest, and open-ended questions in the form of digital post-it notes on a whiteboard app (Miro, n.d.). Next, I proceeded to data analysis. In the analysis phase, I followed the thematic analysis approach.

The tutorial steps and descriptions were matched with the game analytics data to identify the steps, after which fewer players would continue playing the game. However, the high granularity of the steps in the analytics data did not allow to accurately match the steps from the videos. It was still unclear what events caused players to abandon the game.

The duration analysis of each tutorial step was used to compare, for example, the difference in loading times between the sessions of each study participant. This information was cross-referenced further with the type of test device.

Next, I proceeded with a thematic analysis of the qualitative data from the playtest and questionnaire. Originally, the data was collected in a spreadsheet and then transferred to online whiteboard software (Miro n.d.) for the analysis phase. Each piece of information was recorded on a separate post-it note. Test participants were assigned their own post-its color. Unlike in the structured coding approach, in this study, I constructed the themes by naming the groups of similar behaviors, experiences and quotes together. Throughout the analysis, I identified the following themes:

- Interaction with in-game resources and other features.
- Game's technical performance (slow loading time, unresponsive UI behavior).
- Interaction with the characters and upgrading strategies.
- Challenges in learning the core game mechanics.
- Players' preferences (tutorial length, exploration, art style, music, and sounds).
- Brand recognition.
- Interaction with the narrative.

4.2.5 Results

The usability study findings were presented to the team in a report with actionable recommendations. The findings were split by the discipline: game's technical performance, game design, user experience, and art, and covered the abovementioned themes.

Game's technical performance

While playing the game, the UI transitions between the game modes had a noticeable delay.

The first loading times, from the loading screen to the start of the game, varied significantly among all nine participants. The screen blacked out for two participants, and the game became unresponsive in the first minute after starting.

Game design: Interaction with the characters and upgrading strategies

The participants actively used character abilities in battle. Recognizing what the characters' abilities do in a battle was difficult: "Wait, did he (a character) do anything?", "I did not realize what he did." During the playtest session, the participants asked for more information about characters and their special abilities.

Participants wanted to build their team strategically to have characters of as many colors as possible with a certain role/purpose, for example, healer or tank: "Ideally, I wanna have at least one of each (about the team composition)."

The participants wanted to upgrade all characters in the team to the same level: "Let's make sure everybody's got the same level." Most participants used to upgrade the characters regularly, especially after tough battles. However, comparing character information (level, health, attack stats) was not possible on the same screen, and it led to unwanted behavior while upgrading due to being forced to recall the character stats.

User experience: Interaction with in-game resources and other features

The participants reacted positively to getting resources as a reward. However, they were unsure what to use the resources for and could not find more information to clear up the confusion. The confusion was reflected in questions that players asked while playing the game: "What are we using coins and the stars for?", "How can I use these ones (about currency)?", "What am I supposed to use these stars for?".

Furthermore, the participants needed help understanding the rule that certain colors have advantages over others. For example, red beats green, and blue beats red. Participants struggled to remember the color combinations: "I'm not gonna remember all

these." Or they misunderstood it: "Okay, so if they have a red glow around them, so I have to use red."

User experience: Challenges in learning the core game mechanics

Attacking via matches that miss the enemy was confusing for some players. What happened with the attack damage was unclear when it did not hit the enemy. Some players wanted to have the ability to target enemies by tapping them.

User experience: Player's preferences

Some players wanted to explore the game more but were blocked by the tutorial sequence: "I can't look around again. I kind of don't like that. I like being able to look around the game. Before I start playing it", "I feel the game is holding your hand a little bit too much, and it's pretty self-explanatory."

The participants were confused about the length of the tutorial: "Is it going to be the tutorial the entire time? Or when will the tutorial stop?" By design, the tutorial blocks the interaction with other UI elements outside the tutorial sequence. The participants did not know that and thought the game was broken.

The character art style, animation, main theme, and soundscape resonated with the participants: "I love the art. The characters. They're really cute. At first, I was like a, but the background like all the scenes are is like, I love it.", "The animations are really smooth they are not lagging at all", "Okay, cool. It's like realistic. I definitely love the graphics", I like the soundtrack in the background, the music sounds cool. And it's not like annoying, some background music and games can be very obnoxious".

User experience: Interaction with the narrative

The narrative of the game is communicated through dialogues and short cutscenes. Some of the participants found the narrative expressed in the dialogues helpful: "The story definitely helps. I played these games before I think I got tired of it eventually" and engaging: "It's not too repetitive, and they have like a little story behind it. That's nice to be included". The participants laughed at jokes about silly monsters: "Observation note: Reads the dialog aloud. Laughs. Taps "Next", giggles" and were excited to watch the cutscenes: "Oh cutscene. That's cool".

Brand recognition

The game is based on a TV program. Test participants could clearly recognize the characters even if they did not identify as fans. Players admitted not remembering all characters from the program: "I don't 100% remember everyone from the show." However,

they were excited about collecting characters: “Oh, you can collect characters! That’s cool.”

4.2.6 Follow-up evaluation

Based on the results of the initial usability evaluation, I formed four actionable recommendations that were expressed as a set of hypotheses that I suggested to implement in the game and test in a follow-up usability study:

Hypothesis 1: Hiding UI buttons that cannot be accessed during the tutorial will help to focus players’ attention on the core game.

Hypothesis 2: Highlighting only one object at a time (a match or character) while learning core game mechanics will help to focus the player’s attention and reinforce learning during the tutorial.

Hypothesis 3: Simplified tutorial instructions that look like dialogues with characters will capture player attention and will be read/used by players.

Hypothesis 4: Using explicit currency names and adding a tutorial step for using it will help players to understand the purpose and value of the in-game currency.

The primary purpose of the follow-up evaluation was to observe players’ behavior and reaction to the changes implemented in the tutorial phase of the game based on the hypotheses from the initial usability study. The research questions, evaluation approach, and analysis procedure remained close to the initial usability study.

Targeting several user groups split by self-reported playing experience of different games genre has not resulted in finding meaningful differences in the user experience of the game. In the follow-up study, I used all gamer types targeting the same demographic profile as in the previous evaluation (presented in Table 3). Since the targeting was the same for all participants, I requested the third-party service arrange a playtest with five participants in total. Such an amount would allow to notice most of the new usability issues resulting from the tutorial changes.

Table 3. *Participants’ profile for the follow-up usability evaluation*

	Group 1 – unspecified targeting (n=5)
Location	English-speaking countries
Demographics	Age targeting 18-50+, even gender distribution
Gamer type	All gamer types
Competitor games	Competitor games not specified

At first, I focused on examining how well the tutorial improvements addressed the previously set hypotheses. Later, I summarized other findings during the analysis that were not addressed with the new tutorial version.

Hypothesis 1 - supported

After reducing the number of UI elements and using the inactive states for visible buttons, the observations revealed that the participants could solely focus on the end goal of the tutorial and experience less frustration while interacting and navigating the game's UI during the first minutes of the gameplay.

Hypothesis 2 - supported

Highlighting one object at a time while teaching players the core game mechanics helped direct the participants' attention to the right things and speed up learning. On the other hand, the results of having instructions presented in the form of a dialogue with the character being more engaging for the participants were inconclusive.

Hypothesis 3 – not supported

The struggle to understand the color advantage concept persisted in the follow-up study regardless of the efforts to simplify the original instructions and get the point across to the participants.

Hypothesis 4 – supported

The participants did not comment directly on a new tutorial step introducing the use of in-game currencies for character upgrading. However, it was evident that the participants could articulate if they needed more resources to upgrade their characters. Unlike in the previous evaluation, the participants had no trouble recognizing the currencies and could successfully use them in the game.

Some of the changes introduced in the latest version of the tutorial have successfully tackled the problems identified in the previous usability evaluation study. However, there were some issues that either reappeared or were newly discovered in the follow-up study.

A portion of the test participants repeatedly reported prolonged loading times. Similarly, as in the initial study, the participants wanted to upgrade the whole team to the same level instead of leveling up characters separately one by one. In the game, it was observed that all participants continued using characters' special abilities, and most of them figured out how the abilities worked except for a couple of cases.

The new issues that were discovered in the analysis phase featured a lack of autonomy in the tutorial experience, difficulties identifying matches on the gem board, and while reading the story dialogues for the first time. Judging from the gameplay recordings, the participants had various experiences with the tutorial. For some following the tutorial instructions and getting into the state of flow was easy. Unlike in the previous study, those participants could identify at what point the tutorial ends. However, in other cases, the participants craved more freedom, for example, to skip story dialogues or to upgrade the characters more frequently while not being blocked by the tutorial.

Complications with finding a match and reading story dialogues were observed for the first time in this evaluation round. Some participants spent a long time spotting a basic match 3, matched the wrong gems, and misunderstood the meaning of hint animations. Eventually, these players powered through the struggles and managed to win battles and progress further in the game.

While being presented with the dialogues for the first time, the participants tried reading them aloud. However, based on the observation, they had trouble distinguishing words in a sentence. The dialogue font style and its kerning require a thorough accessibility review.

Besides the abovementioned challenges, the participants expressed affection towards the game graphics, music and sound, character appearance and animations, and narrative in dialogues and cutscenes. The participants laughed at jokes in the dialogue. Some participants found the game "a little addictive," they could "get in the zone" while playing.

In the follow-up usability evaluation study, I could validate that some of the tutorial's changes positively impacted the players' user experience by making the interaction with the game coherent and straightforward. The changes reduced the occurrence of certain usability problems, such as not knowing the currencies name and their purpose, difficulty learning the core game mechanics and frustrating interactions with visible but inactive UI elements on the screen. On the other hand, game performance and flow issues persisted in the game regardless of the changes. Additionally, a lack of player autonomy and new usability and accessibility problems were discovered in the game. Evidently, the game requires another round of iteration to address those issues.

4.3. Accessibility evaluation of the game

During the present research, the game studio committed to reducing barriers to accessing, playing, and enjoying its games for all players. One of the steps towards this commitment was a performance of the accessibility evaluation of the game. In the following section, I will describe the accessibility guidelines, evaluation procedure, and findings of the accessibility evaluation of the game.

4.3.1. Background

The accessibility of a game is a crucial factor influencing players' user experience. Due to varying data depending on a region and the fact that not all disabilities are identified or reported, it becomes hard to estimate the exact number of mobile game players with disabilities. According to estimations of the World Health Organization, 1.3 billion people (16% of the world population) experience significant disability (World Health Organization, 2023). Director of Accessibility at Xbox, Anita Mortaloni, refers to a figure of 400 million to describe the number of players with disabilities globally (Mortaloni, 2022). From the total population of all players with disabilities, the share of mobile game players is expected to be significant.

Accessibility in games refers to avoiding unnecessary barriers preventing players with physical, visual, auditory, and cognitive impairments and other types of disability from accessing or enjoying the game (Ellis et al., n.d.). Disabilities can be either permanent, temporary, or situational.

Console games made a significant impact on promoting accessibility and inclusion in video games. For instance, Microsoft Xbox has developed robust accessibility guidelines for game developers and invested in creating the Xbox adaptive controller.

Compared to console games, less attention has been paid to mobile games' specific accessibility guidelines. In many ways, the Xbox Accessibility Guidelines (XAG) are universal and can be applied to mobile game development. However, the touchscreen interface implications are not considered in XAG (Microsoft, 2023). Google and Apple provide accessibility guidelines for touchscreen interfaces that can be combined with gaming accessibility best practices (Apple, n.d; Material Design, n.d).

4.3.2. Evaluation procedure and methods

In the accessibility evaluation of the game, I followed a combined list of accessibility requirements based on XAG, Apple's Accessibility guidance, and Material Design accessibility best practices (described in Table 4). The evaluation focused on specific game areas, including text display, contrast, additional channels for visual and audio cues, subtitles and captions, audio accessibility, customization, cognitive load, photosensitivity, interactions, buttons and controls, and game difficulty options (Microsoft, 2023; Apple, n.d; Material Design, n.d).

Table 4. *List of best practices for the accessibility evaluation.*

Category	Description
Text display	Defines minimal font size, and specific font style requirements for readability, for example, use of sans serif fonts, left alignment, character limits, line spacing, text-to-speech support.
Contrast	Sets contrast ratio for text (4.5:1 against the background), non-text visual elements (3:1).
Additional channels for visual and audio cues	Encourages the use of multiple sensory methods, for example, visual communication should not only rely on color but instead use patterns, shapes, text, and icons along with color, use of haptics and audio cues.
Subtitles and captions	Emphasizes that subtitles should accompany speech content in the game.
Audio accessibility	Requires providing players with the possibility to configure the volume of music, sound effects, and ambient sounds separately.
Customization	Recommends allowing players to access the game options before the gameplay to set up controls, UI text size, volume, and other settings.
Cognitive load	Promotes the principle of recognition rather than recall in summarizing long narratives and the ability to recap them after a while. Encourages the use of objective reminders, a clear indication of interactive elements, helping with navigation, providing tutorials and tutorial replayability, and teaching game mechanics through play.
Photosensitivity	Restricts use of flashing images, flickers, strong visual effects for prolonged time on a large share of the screen.
Interactions	Suggests using simple tap interactions rather than more complex double tap, long press, swipe, repeated press, and complex gestures. Use digital and physical buttons where appropriate.
Buttons and controls	Sets minimal requirements for the hit area size (44x44) and the minimal space between the hit areas of interactive elements. Encourages to provide support/ or at least not block the use of external controllers.
Game difficulty options	Recommends providing players with multiple difficulty options.

In practice, I examined the game project and flagged the game areas that did not fulfill the accessibility recommendations. Not all game categories from the accessibility recommendations list were relevant in the context of the game. Subtitles and captions were

not used in the game since there is no audio content in the cutscenes, and the character dialogues are presented as text in speech bubbles.

4.3.3. Results

The issues with font readability and difficulty correctly identifying match 3 were discovered during the follow-up usability evaluation of the game. As a solution, the text size, contrast, buttons and controls, photosensitivity, and color-related accessibility requirements were reflected in the new user interface style design and the UI guidelines expected to be implemented in the game. The next logical step after the expert evaluation of the game's accessibility would be an evaluation round of the new UI style with a panel of players with disabilities to confirm that the applied standards are sufficient for an accessible user experience. The design and planning of this evaluation are still ongoing.

4.4. Experience-driven design workshops and experience goals

After accumulating and processing the existing data about player motivations and their experiences in the game, results of usability, and accessibility evaluations, the next goal was to onboard the game development team to the experience-driven design method.

The workshop's purpose was to leverage the multidisciplinary team's expertise and create the initial experience goals for guiding the design focus of the game improvements. The following section describes the workshop structure, methods and tools, the process, and the results of defining the experience goals.

4.4.1. Team onboarding workshops

I designed a series of workshops for the team of product managers, programmers, game designers, user interface (UI), and technical artists focused on team building and organization, a brief theoretical introduction to the experience-driven design approach, reviewing the data about current players' user experience, identifying the core problems, and setting the initial high-level experience goals for the redesign of the game.

Visualization of the workshop process

The purpose of these workshops was to explore the problem space of the current user experience in the game to foster empathy towards the players among the developers and co-create the new experience goals with the team before proposing solutions and feature ideas. I used a standard design thinking technique, double diamond (presented in Figure 1), for structuring the workshop sessions. At first, the goal was to explore all

feedback and previous findings about the game we received from various sources and identify the core problems. In the next stage, the team used the value effort matrix tool (presented in Figure 2) to evaluate the problems and prioritize them according to high value, low or significant effort. In the later stages, the plan was to brainstorm the potential solutions and features that would reflect the solutions in the game.

Double Diamond Process

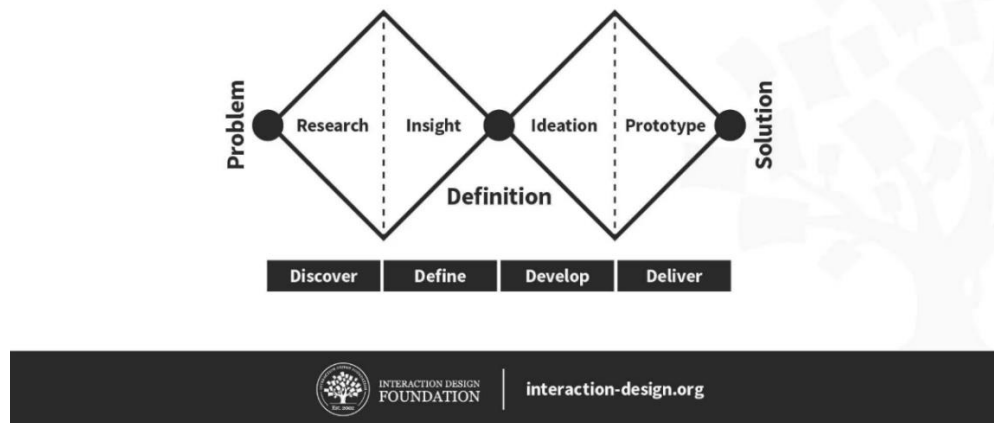


Figure 1. Double-diamond technique visualization (Dam et al., 2021).

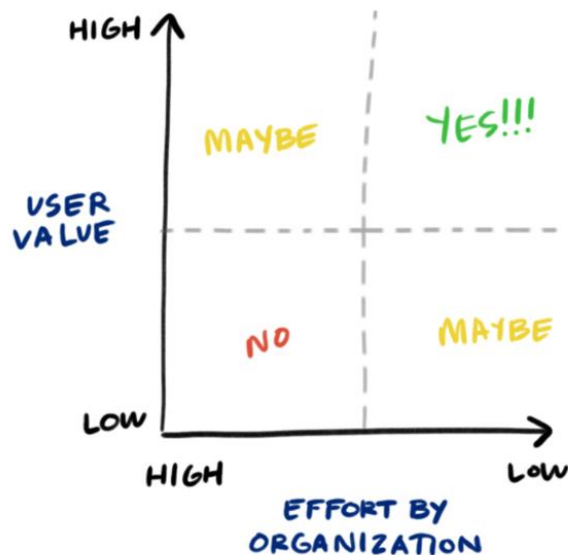


Figure 2. A prioritization matrix indicating value to the user and effort by an organization (Gibbons, 2018).

In total, I organized six workshops with the game development team. As a workshop facilitator, I spent most of my time preparing and organizing the meetings. I gathered the previously collected background research data on the same digital whiteboard and

performed a thematic analysis to combine similar feedback and research findings categories under the same theme. Other team members worked full-time on the development of the game. Together with the team, we gathered once a week for a 1.5h hybrid session to discuss a specific topic or brainstorm ideas.

During the first few sessions, my main objectives were to explain the reasons behind the re-design, present the data about the current player experience and introduce the experience-driven design framework to the team. In the beginning, the progress felt slow. Since the team spent most of the time on hands-on work in the game, it struggled with new abstract concepts and questioned the trustworthiness of the gathered data. Through a series of discussions, we cleared up the confusion by reviewing the data collection and analysis methods. We could proceed further to identify the core problems behind the existing data.

4.4.2 Formulation of the initial experience goals

Next, the findings were split into two categories what was broken in the game and what worked great. With the team, we examined the negative feedback and formulated common root causes of those problems. Studying and analyzing the user experience problems in the game brought valuable insights and helped connect problems with practical solutions that could be implemented during the redesign.

In the next phase, we examined how the core problems manifest in players' user experience. Although the team could already generate ideas on fixing the identified issues, we had to review the data again to formulate the initial experience goals. On the original whiteboard, I disregarded the previously set themes and tried to identify the keywords linked with the players' experiences, feelings, and emotions. From positive and negative feedback, I could create three thematic clusters to define the high-level experience goals for the game (presented in Table 5).

Table 5. *Experience thematic clusters*

Experience descriptions	High-level experience goal
Excited to trigger a chain, fun twist to a typical matching game, addicting gameplay.	Action
Laughing at narrative jokes, collecting characters is interesting, enjoying music, cutscenes, animation, and special effects, feeling confused with game features, players' flow being interrupted by crashes, feeling difficult to remember information about special abilities, feeling bored with repetitive gameplay.	Immersion
A feeling that the tutorial is rushed, decision-making is taking much energy, inability to customize the sound experience, interactions take too many steps, feeling of being restricted,	Approachability

missing skip and speed up functionality, and inability to have fun not knowing the characters, confusion about too new features.	
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Action, immersion, and approachability are generic concepts. I defined their meaning in the game's context.

- Immersion – a feeling of being part of the game's universe, exploring the world and experiencing the narrative as one of the characters in the game.
- Approachability – the game is easy to pick up, no previous knowledge is needed, and it fits various skill levels and playing styles.
- Action – being pumped and excited using superpowers, triggering a chain with powerful matches to fight enemies.

The high-level goals are difficult to use in the design process without defining more concrete user experience implications that can be reflected in the game features. Among the three experience goals, it was evident that players experienced and enjoyed the action in the game through the core game mechanic. In contrast, immersion and approachability highlighted distinct gaps in players' user experience that could inspire game improvements.

The examples of immersion and approachability manifesting in the game could be divided into elements that create and enhance or break and weaken immersion and approachability (presented in Table 6 and Table 7).

Table 6. *Drivers and hindrances of the immersion experience goal*

Immersion drivers	Immersion hindrances
Narrative, jokes in character dialogues, cutscenes.	Confusion about the feedback that the game provides, not understanding what is going on.
Getting to know the characters and their superpowers.	Players' flow breaks, and they are unsure if they will lose progress when the game crashes.
Facing the enemies and finding ways to beat them.	Feeling bored with monotonous gameplay.
Exploring the game world and game modes.	A feeling that the game is broken, and it is hard to predict how it will behave when encountering visual glitches and inconsistent UI behavior.
Art, visual aesthetics, special effects, and animations make the world look alive.	Cognitive overload - players must remember too much information.
UI that seamlessly helps the player to interact with the game (clear, readable, useful).	Players take a longer time to learn more complex features.
Soundscape and music creating a certain mood.	

Table 7. *Drivers and hindrances of the approachability experience goal*

Approachability drivers	Approachability hindrances
Using familiar patterns and conventions - players feel that the game is similar to what they have played before.	A need to have some previous knowledge about the game to have fun from the get-go.
	Not having tools to customize music and sound experience.
	Players feel blocked by the tutorials. The pacing of giving instructions feels too slow or too fast.
	Tutorials explaining simple things
	Not meeting accessibility standards - players with sensory disability (permanent or temporary) might have difficulties playing.
	Players feel that interaction with features takes too many steps.
	Players need more information, ability to skip or speed up in the game.

The UX implications described above can be reflected in several game features. To find ways of measuring how successfully the set experience goals meet the need of the players, I had to narrow down the feature scope.

5. PROTOTYPE EVALUATION

This section aims to present the findings from the comparative prototype testing, analyze their impact on the current design of the dialogues feature and outline the plan for the follow-up evaluation focusing on how players experience immersion and approachability in the game while interacting with the dialogues.

5.1. Comparative prototype testing of character dialogue feature

5.1.1 Background and scope

Throughout workshops with the game development team, I have outlined the three core experience goals, immersion, approachability, and action. According to the players' positive feedback, the action goal has already met the audiences' expectations. On the other hand, immersion, and approachability goals were identified by analyzing players' negative experiences and blockers. These two goals were selected as the leading objectives for improving the game.

Since the game was already feature complete, my main challenge was to select the parts of the game that provided the most impact on the players' user experience and produce redesign strategies that would target either immersion, approachability, or both experience goals.

Focusing on creating the initial positive impression of the game can affect the player's short- and long-term retention. I started by reviewing the players' feedback on the experience with the features that players interact with during the first hours of the gameplay.

When players launch the game, they are presented with a loading screen featuring its main characters. The game starts with a short cutscene that sets the mood and introduces the premise of the game and its game mechanics. After watching the video, players continue to immerse themselves into the narrative and game world through the dialogues between the characters before their first encounter with the core game mechanics.

The workshop findings highlighted a few problems that players face during the first minutes of the gameplay that might affect their engagement with the characters in the long term:

- Not knowing the characters from the TV program and having no way of learning more about them in the game negatively affected the engagement with the narrative.
- It was difficult to remember character names and places in the game world for the story to make sense.
- Some players would prefer to have the ability to skip the character dialogues, but this functionality was missing.
- There is no way to recap the narrative and remind the players what is going on if players leave the game and return after some time.

Moreover, the analysis of game analytics data pointed out that players spend less time interacting with the dialogues compared to other features during the first day of playing the game.

Together with the team, we decided to redesign how the character dialogues are presented in the game to create a stronger and more meaningful connection between the players and the characters, allow the dialogues to be reviewed, and allow players to skip the dialogues.

The new dialogues iteration would be targeting both experience goals immersion and approachability. The design implications of immersion and approachability are described in Table 8.

Table 8. *Experience goals for the dialogues feature*

Immersion	Approachability
Create a new visual style for the dialogue featuring characters' emotions and facial expressions.	Allow players to review the whole dialogue on the same screen.
Use images to illustrate exciting moments in the story.	Add skip functionality.

5.1.2 Prototypes design for the comparative testing

At this concept development stage, I chose the comparative prototype testing method to gain deeper insight into how players interact with the current dialogue feature, the first impressions of the new dialogues' presentation, and potential usability issues arising in the new feature design. I used the non-code prototyping software Protopie for creating and testing the prototypes with the users (High-Fidelity Prototyping for Mobile, desktop, web & IOT n.d.).

I created two high-fidelity interactive prototypes that imitate the first few minutes of the gameplay after downloading the game. Prototype A (presented in Figure 3) represented the current implementation of the dialogues in the game and prototype B (presented in Figure 4) demonstrated the new visual style of the dialogues feature. The characters and the dialogues were identical in both prototypes. The only differences were a visual representation of the characters and their speech bubbles and a skip feature in prototype B.

In prototype A, only one dialogue was shown on the screen. The speakers were displayed as full-body characters. The active speaker was indicated by displaying their name and having their image closer to the viewer than inactive characters placed in the background. To continue to the next piece of the dialogue, players must tap the button “Continue”.

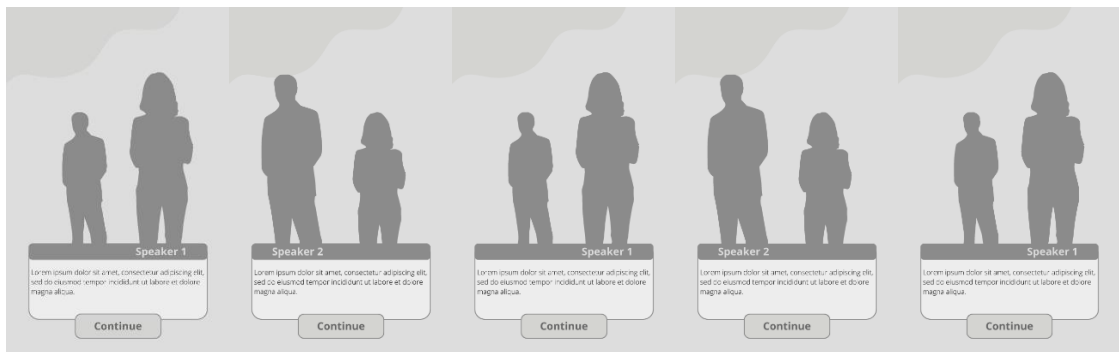


Figure 3. *Dialogues in prototype A.*

Instead of full-body characters, players were shown character portraits with speech bubbles in prototype B. All dialogue pieces were displayed on the same view. The new dialogue pieces would appear under the previous speech bubble. There was no clear indication on how to trigger the next dialogue. Players could tap on any place on the screen, and the new dialogue piece would appear. At the end of the dialogue sequence, the players could scroll up to review the whole dialogue from the beginning. At the bottom of the screen, a "Continue" button would appear that would take the players to the core gameplay.

Prototype B used a similar way of displaying the skip functionality as in the cutscene by showing the “>>” sign in the bottom right corner of the screen. Tapping the “>>” sign would force all dialogues and the “Continue” button to appear on the screen at the same time.

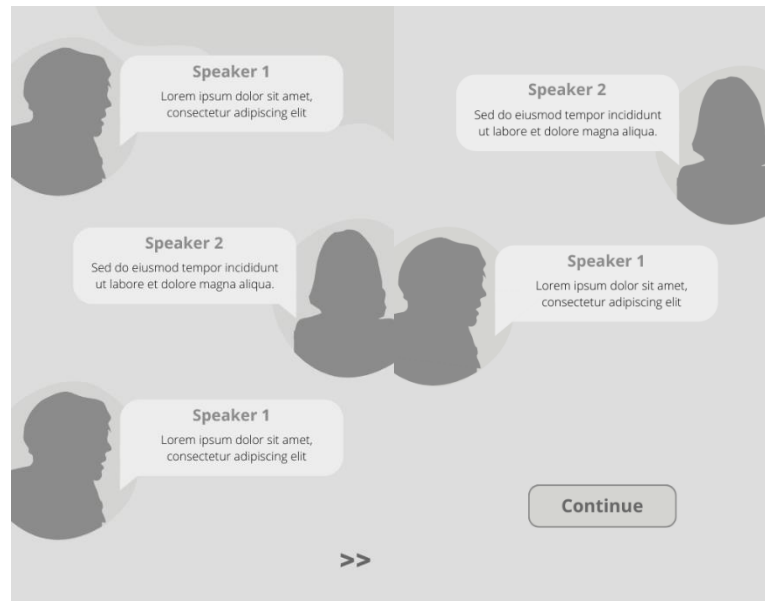


Figure 4. *Dialogues in prototype B.*

5.1.3 Design of the test

The purpose of the prototype evaluation was to observe how the players interact with the current and the new iteration of the dialogues feature and compare the positive and negative aspects of both prototypes.

At this stage, I was not pursuing the goal of evaluating the experience goals in detail. The nature of this evaluation round was explorative. It aimed to provide insights into improving the new dialogues design concept.

The design of the test procedure was straightforward. Players would be presented with two interactive prototypes and asked to play through two sets of dialogues following the in-game instructions. The order of the prototypes shown to the test participants would be randomized to reduce the effect of potential cognitive biases. After completing the dialogue sequence in the first prototype, the players would be asked questions about their experiences.

The second prototype would be shown next, and the participants would again be asked about their experience after playing through the dialogues.

At the end of the session, participants would be asked to compare both prototype experiences and give their opinion on which prototype they preferred the most.

5.1.4 Participants recruitment

The test participants (described in Table 9) were selected from the same company's employees to speed up the test scheduling process. An info message about the test was sent internally to a team that has not participated in the game's development. The message contained a brief description of the test, the time and date, and the name of the evaluator conducting the test. The participants were not offered any monetary compensation for participating in the test.

On the agreed day, I, as an evaluator, randomly selected three team participants. The fourth participant was recruited on the same day outside the team, receiving an info message.

Table 9. *Participants' profile for the comparative prototype evaluation*

	Participant 1	Participant 2	Participant 3	Participant 4
How familiar are you with the TV program that the game is based on?	Watched three first seasons	Has on the watch list	Has seen all seasons	Watched the first season
Have you played the game before? If yes, how far along are you in the game?	Played a couple of sessions	Tried the game	Played a couple of times	Just downloaded and played it a couple of times
In the past 30 days, how many times have you played mobile games?	Doesn't play mobile games	No answer	Chess, Royal Match	Doesn't play mobile games
Prototype sequence: A - original dialogues, B - new design	A, B	B, A	A, B	B, A

5.1.5 Evaluation procedure

In this study, I conducted evaluations with four participants in total. The prototype evaluation was organized face-to-face at the office premises. I chose an open café space with a few chairs and a table to conduct the prototype study to make the test situation more casual and relaxed for the participants.

At the beginning of the session, I introduced myself to the participants and explained the purpose of the study following the script (presented in Appendix B). As part of the instructions, I emphasized that the participants were not the study's subject and that there

was no right or wrong way to play the game. The participants were instructed to play the game the same way as any other game downloaded from Appstore or Google Play.

Next, I explained the prototype testing procedure and asked for verbal consent to record the audio during the test. I mentioned that the recorded audio data would be used for transcribing the test results. It would not be linked with any personal information of the participants and would be destroyed after the analysis of the data is over.

After receiving consent from the participants, I started the recording by asking a few background information questions to break the ice and make the participants feel more comfortable before interacting with the prototypes. The questions were focused on familiarity with the TV program, the game, and their experience with other mobile games.

Before each session, I randomly assigned the order in which the prototypes would be shown to participants A and B or B and A. Each participant used a mobile device (iPhone 8) I provided during the test. I would launch the prototype and ask the participants to follow the game instructions.

Initially, I planned to have a colleague participate in the test as an observer. Unfortunately, due to a schedule clash, my colleague could not join the session. I had to assume the observer role and write down my observations during the test.

After completing the dialogue sequence in each prototype, I asked questions about the participant's experience (presented in Table 10). The final set of questions (presented in Table 11) focusing on comparing both prototype versions of the dialogues would be presented to the participants at the end of the session.

Table 10. *Questions after completing the task.*

Theme	Question
Emotions about the overall experience	How did you feel about the dialogues that you just played?
Recognition of character's emotions	What kind of emotions do you think the characters have in the story?
Experiences with the narrative	What do you think about the story itself?
	Would you be interested in learning more?
Negative experiences	Have you encountered any problems or annoyances?
Other questions	Do you have any questions at this point?

Table 11. *Prototype comparison questions.*

Theme	Question
Emotions about the overall experience	How did you feel playing through the story/ reading dialogues?
Prototype differences	What kind of differences did you notice in these prototypes?
	What things were the most memorable in both prototypes?
	What was easy and what was difficult in each prototype?
Prototype preference	If you would imagine playing the game daily, what way of presenting the dialogue would you prefer, A or B?

The evaluation would be concluded by thanking the participants for their time and effort and asking for any feedback or questions regarding the test. The audio recording of the session would be stopped and saved on my mobile device.

5.1.6 Data analysis

The data obtained from the evaluation sessions consisted of audio recordings of participants thinking aloud, interview answers and written observation notes. The transcribed interviews and notes were added to the Miro board as digital post-its. For each participant, I assigned a color code (Miro n.d).

During the analysis phase, I applied the thematic analysis method. In this study, I created interview questions based on several pre-defined themes for grouping the study results. The initial topics focused on participants' positive and negative experiences with both dialogue prototypes, personal experience, and feelings towards the prototypes during the evaluation, recognition of characters' emotions, opinions about the narrative, and overall engagement with the narrative in the game.

Throughout the analysis process, I identified a few additional topics outside of the pre-selected list. Personal preferences, accessibility, and interaction patterns stood out from the interview results.

5.2 Results of the prototype testing

As described in the methodology chapter, the comparative prototype evaluation was conducted with four participants (P1, P2, P3, P4) on a mobile device in an informal setting, a café space, to ensure a more relaxed atmosphere during the test. The participants were presented with both prototype versions A, which resembled the presentation of the

current dialogue in the game, and B, a new visual and interaction design of the dialogues feature. The order of showing the prototypes to the participants was randomized.

During the analysis of participants' answers and observations, I detected the following positive and negative experiences (presented in Table 12 and Table 13) with both prototypes of the dialogues feature:

Table 12. *Positive and negative experiences while interacting with prototype A.*

	Prototype A
Positive experiences	Focus on a single dialogue: the dialogues used a more accessible font size; visuals emphasized a single dialogue piece. "Now it felt more that visuals were related to the dialogue itself when in the previous one it felt as a generic background" (P2).
	Animated dialogues felt alive: it felt more like a game when the objects and characters moved, and texts came individually via tapping the button. "There were some objects moving, so it felt more like a game" (P4).
Negative experiences	The slow progress of the dialogue narrative: it felt that the story was not progressing in the dialogue's narrative. "The dialogue itself, I think it did not progress the story. It was standing still in a way. Some of those dialogues could have been cut" (P3).
	Not recognizing the inside jokes: the participants did not have enough context to care about some "inside jokes" in the dialogues.
	Disconnection between the cutscene and dialogues: the expectations about the mood set by the cutscene were not met in the dialogues.

Table 13. *Positive and negative experiences while interacting with prototype B.*

	Prototype B
Positive experiences	Less overwhelming experience: feeling that there was less text than in prototype A, and it was displayed in smaller chunks. "Somehow, I felt less overwhelmed this time" (P1).
	Clear visual communication: the visual presentation of dialogues was described as nice, fresh, and clear. "It was clear who was saying what" (P2). "All the pictures, all the bubbles, I did like those" (P4).
	Meeting a need to recap dialogues: some participants appreciated having an opportunity to go back and re-read the previous dialogues.
	Illustrated dialogue actions: use of static images illustrating actions in the dialogues was praised. "I like this "Slam" (a static image appeared in the dialogue). It was not obvious that he left through that door, but I like this way of showing that action" (P3).
Negative experiences	Lack of control over dialogues: the participants were confused and did not feel in control when there was no clear indication (a button/ instruction text) of how to progress to the following dialogue. "Where's the "Next" button that I need to hit?" (P4).
	Confusing dialogues due to unfamiliar characters: the participants felt confused about the dialogues because they did not know the characters. "I didn't understand that much what that was about. As I said, I didn't know the characters" (P2).
	Missing character introduction: some characters felt out of place because they were not properly introduced in the game.

Other common themes that I identified while analyzing the data included the following:

Recognition of the characters' emotions

In both versions of the prototype, most of the participants could recognize the characters' emotions. The participants noticed that in both prototypes, the characters expressed the same emotions, such as surprise, fear, disbelief, and confidence.

Indifference about the narrative in dialogues

Most of the participants, except one, expressed some degree of indifference or lack of interest in the game's overall narrative. The reasons for that mentioned by the participants included a habit of tapping through dialogues without paying attention to it, being not familiar with the premise of the TV program that the game was based on, the fact that it was a testing situation, being unsure what to expect from the narrative because of the mismatch between the cutscene and the dialogue.

The participants linked their low interest in the game's dialogues with not being familiar with the TV program or missing some context from the seasons they have not watched.

Overall engagement with the game's narrative

Although the momentary experiences with the game's dialogues during the prototype test were described as uninteresting, most participants were curious to learn more about the story in the game, especially after testing prototype B.

The cutscene that was shown in the game before the dialogue was positively highlighted by most of the participants. "I think it was cool and mysterious" (P3). "It's so crazy what you can do these days (about the cutscene)" (P4). However, for some participants, the cutscene set expectations about the narrative that were not met in the dialogues.

Impact of personal preferences on the experience

While analyzing the test results, I discovered a set of participants' personal preferences that affected their experience with the prototypes. Some of the participants reported a preference for tapping through the dialogues without paying too much attention to the story. One participant described themselves as "not a huge fan of comic books." Therefore, prototype B was the least favorite compared to prototype A. Another participant mentioned the need to spend more time with the game to get engaged with the story. A few participants described themselves as slow readers. Having control over the pace of the dialogues was a necessary requirement for them.

Visual accessibility of the dialogues feature

During the test, one participant tried pinching the screen to zoom in on the dialogues in prototype B. While answering the prototype comparison questions, the participant noted

that the text in prototype A was bigger than in B. Moreover, the participant mentioned having the wrong glasses for reading small dialogue text.

Interaction patterns

One of the critical differences between prototypes A and B, besides the visual presentation of the characters and speech bubbles, was the communication of how to trigger the following dialogue to appear on the screen. In prototype A, there was a visible "Continue" button at the bottom of the speech bubble. Prototype B had no visual indication of how to trigger the next dialogue. The participants were expected to tap on any place on the screen, and the next dialogue would appear. Additionally, prototype B had a skip functionality signified with a visible ">>" sign at the lower right corner of the screen (presented in Figure 5). Tapping the sign forces all dialogues and a "Continue" button to appear on the screen at the same time.

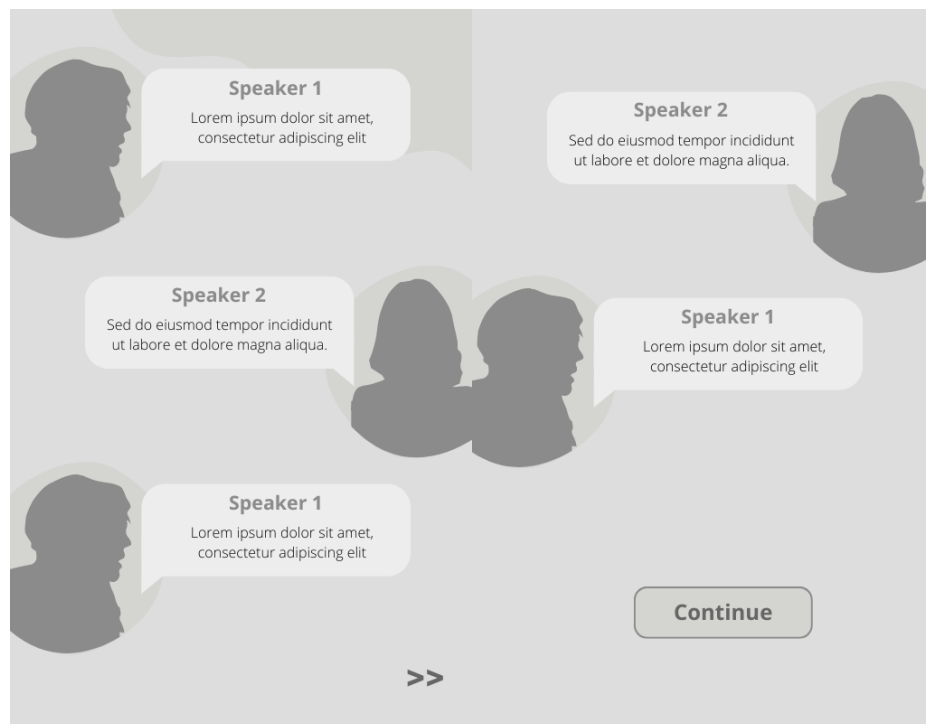


Figure 5. *Prototype B: visual communication of the skip functionality.*

The participants presented with prototype B first were unsure how to make the next dialogue appear on the screen. One of the participants asked what the ">>" sign meant and if they needed to tap it to proceed to the next dialogue. Another participant tapped the ">>" sign, thinking this button controlled the dialogue. When all dialogues emerged on the screen, the participant felt dissatisfied due to a lack of control over the dialogues. "What I didn't like about it that I needed to just to scroll down. What I would have preferred for myself is when you press something, then the actual picture changes and evolves the story" (P4).

Although the number of participants performing the comparative prototype testing was four, the evaluation provided the opportunity to detect critical interaction problems and acquire valuable feedback for improving the dialogues feature further.

5.3. Design implications of the research findings

The findings described above provided valuable context and lessons for the new iteration on both the feature design and the evaluation procedure. Positive experiences with prototypes were rooted in emotional responses towards how the information was presented in dialogues, character animation, visualized actions, and the ability to recap the dialogue from the beginning. The negative experiences arose from a lack of control over the dialogues, slow narrative progress, a feeling of not being familiar enough with the characters and the back story, and unmet expectations set by the cutscene. In this section, I will provide commentary on the test results and discuss the possible actionable recommendations.

The objective of the comparative prototype testing was to highlight the positive aspects of both versions, uncover the potential problems of the new feature design, and prepare the ground for the evaluation of immersion and approachability experience goals. Preferences expressed by the participants were translated into design requirements for the next iteration.

Based on the prototype evaluation findings, I verified some of the design assumptions about visual communication, clarity of presented information, and usefulness of dialogue review functionality. The immediate positive impression of the characters' portraits and speech bubbles is a reassuring signal that, visually, the design is going in the right direction. The participants described the new way of presenting the dialogues as nice, fresh, and clear. Additionally, the illustration of the characters' actions during the dialogue got a positive response from the participants.

One of the goals that the team was pursuing with the new dialogues design was making the interaction with the dialogues more immersive and less tedious. According to participants' feedback, the text felt shorter and less overwhelming in the new dialogue design compared to the current version. Thus, I can suggest that the new dialogue design is on the right track toward the immersion goal.

To achieve the approachability goal, I proposed adding two new features: the ability to skip and to review the dialogues from the beginning. In the current dialogue implementation, players are forced to play through a complete dialogue sequence with no option to skip, fast forward, or recap dialogues. It limits players' autonomy in the game, and

based on earlier user research findings, it creates annoyance with the feature rather than promotes immersion in the game. Some participants expressed interest in the dialogue review feature during the prototype evaluation and mentioned that it fits their playing style. On the other hand, the skip feature has not been purposefully used by the evaluation participants. One of the testers used it accidentally. The data on the usage of the skip feature is missing and needs to be obtained in the next evaluation round.

Regardless of the limited scope of the prototype testing, I could identify the following critical problems with feature interaction and functionality communication. In hindsight, not indicating visually the interaction pattern of triggering the next dialogue in prototype B was an easy mistake, which broke the immersion with the feature completely for one of the test participants, which could be avoided. However, I needed to confirm the assumption with empirical data to determine which direction to take the design. Two prototypes helped identify core factors that make the experience enjoyable and satisfactory. Hence, the sense of control over how fast the dialogues appear on the screen, which was prominent in prototype A, was identified as one of the key experience goals in addition to immersion and approachability.

The indication of the skip feature with only a sign ">>" proved insufficient for setting the right expectations about the consequences of tapping it. A sign could easily be misinterpreted as well as the action caused by tapping it.

The evaluation findings stress the importance of accessibility in feature development. The new design had a smaller font size compared to the current dialogue texts. One of the participants had trouble reading the dialogues, which impacted their experience with prototype B.

The character and dialogue text animation created a positive impression of the dialogue feature in prototype A. In comparison, prototype B only had an entry animation for the character portraits and speech bubbles, which felt lifeless and not engaging. According to participants' feedback, they needed to watch the TV program to engage with the game's narrative. Otherwise, it was confusing what the dialogues were about. Moreover, even participants familiar with the TV program felt that some of the new characters in the game were not properly introduced and felt out of place. While the momentary interactions with the dialogues during the test did not feel engaging, the participants expressed interest in learning more about the story. Other means of presenting the narrative in the game, such as cutscenes, intrigued the participants. However, they noticed a mismatch in the mood and expectations between the cutscene and the dialogues.

Based on the problem descriptions listed above, I drafted a few ideas of actionable recommendations that could be used to address those problems in the next design iteration (described in Table 14):

Table 14. *Design recommendations based on experience goals.*

Experience goal	Recommendation	Description
Sense of control	Create a sense of control	Create a clear indication, for example, by using a button with a clear call to action that would control the appearance of the next dialogue on the screen. Another option would be to add the text with instructions to tap anywhere to continue to the next dialogue.
Approachability	Accompany the skip sign with text	Adding "Skip" text along with the sign aims to clear out the confusion and set the right expectations about the consequences of pressing the sign.
Approachability	Adjust the size and test the readability of the text of the dialogue	Adjust the text size to meet the accessibility guidelines for text. A more time-consuming but impactful idea would be to test the feature with a panel of participants with at least visual disabilities.
Immersion	Add animations to characters and speech bubbles	Characters can have a screen entry animation and animated facial expressions to appear alive. Consider animating the text, speech bubbles, and static images to make the experience more dynamic.
Immersion	Review the content of the dialogue	Ensure that the characters get introduced to the player in the game and that there is no need to know anything about the TV program to have fun in the game. Create a smoother transition between the cutscenes and dialogues.

The comparative prototype testing presented in this section provided useful ideas and cleared out doubts about the design for the next iteration. Furthermore, based on the challenges the participants faced during the test, I identified a sense of control, an additional experience goal to immersion, and approachability.

5.4 Limitations

Although the findings formulated throughout the analysis of the comparative prototype test of the dialogue feature look promising and highlight a particular design direction, these data must be interpreted with caution due to several research limitations that might have affected the study results.

It is important to reiterate that the comparative prototype testing's purpose was not specifically focused on evaluating the dialogue feature's experience goals. The study described earlier prepared the ground for further evaluation of overarching immersion and approachability goals and helped identify a new dialogues-specific experience goal – a sense of control.

Among the constraints related to the prototype evaluation procedure, I can highlight the content of the dialogues used in the test, limited prototype functionality, the impact of the test situation on the usage of the skip feature, and ineffective post-task questions.

Thinking back, the content of the dialogues presented in the prototype might have affected the engagement of the test participants with the narrative of the game and their indifference towards it. For both prototypes, I used the same content. However, I limited the number of dialogue sequences from 5 to 2 to keep the testing session within a reasonable schedule. The participants reviewed the first and last dialogue sequences during the test. Even though the content in between the first and last dialogues did not provide any significant information that would affect the understanding of the last dialogue, for the participants it might have felt out of place. Besides the content, the limited time the participants spent with the dialogues during the evaluation impacted their interest and engagement. Therefore, it is crucial to allow the participants to experience the dialogues the same way they are presented in the game to evaluate their user experience with the feature without the pressure of the testing situation.

A common challenge in prototype testing is a tricky balance between spending time on creating as high-fidelity prototypes as possible or a good enough version that communicates the minimum viable idea of the feature. In my study, I chose to use high-fidelity graphics for creating both prototypes. However, I decided to save time on adding animations to characters and text for prototype B. In the evaluation, the participants noted that prototype B felt lifeless compared to prototype A. This feedback is valuable and justified. Having little or no animation in the game might negatively impact the immersion with the feature. I added animations as design requirements for the final implementation of the dialogues feature.

As it was indicated in the section above, none of the participants used the skip feature purposefully. One of the participants clicked the skip sign “>>,” thinking it would show the next dialogue on the screen. There could be a few explanations for this. Firstly, the skip sign had no label or indication of its meaning. I could assume that the participants did want to risk tapping an unfamiliar sign. Another explanation could be that the testing situation did not allow the participants to feel comfortable playing the game as they would

outside the test, regardless of the pre-test instructions. Using the skip feature might have felt wrong in the context of testing the dialogue feature. Besides the UI changes explicitly stating that this is a skip button, I would conduct the next round of evaluation as a remote unmoderated playtest instead of a face-to-face session to shift focus from performing in the test to playing the game in a natural setting.

During the prototype evaluation, I noticed that some post-task questions I asked the participants produced unhelpful results. For instance, questions about what character emotions the participants observed in the story and what was memorable in both prototypes puzzled the participants. The question about character emotions was perceived as tricky as if there was some difference between the prototypes they overlooked. The participants could rarely name something memorable in both prototypes. Instead, they were retelling their experiences. Two other questions produced slightly contradictory results. When the participants were asked what they thought about the story, most answered that it was uninteresting. However, to the follow-up question, "Would you be interested in learning more?" the participants answered positively. Refining the questions can help acquire more accurate insights from the next test participants.

The previously described evaluation procedure limitations will be addressed in the next evaluation round of the dialogues feature that will primarily focus on the following experience goals: immersion, approachability, and sense of control. Unlike the current prototype test of momentary experience with dialogues, the experience goal evaluation will focus on players' user experience development with dialogue feature over time. I planned a weeklong longitudinal study conducted as a series of remote unsupervised playtests and a diary study. However, due to project limitations related to the feature development schedule, the experience goal evaluation will be conducted outside this research scope.

6. DISCUSSION

In the following chapter, I will reflect on the research findings, formulate answers to the primary research questions, examine the connection between the theoretical background outlined in the literature review and research findings, and finally, outline the plans for the next round of experience goals evaluation and potential future research directions.

6.1 Summary of research findings

When I embarked on this research project, I had a pressing need to find a way to address players' user experience problems in an existing mobile game. Iterating the design by focusing on fixing individual usability problems led to marginal positive outcomes. At the same time, the amount of feedback signaling a clear need for more a dramatic change in the players' user experience was overwhelming. The feedback itself consisted of multifaceted unanalyzed data. I needed a systematic approach with a clear starting point to help me grind through the data and create actionable design recommendations. The discovery of the experience-driven design approach inspired me to experiment with applying the experience-driven design method to mobile games and set experience goals for guiding the process of improving the existing game.

Although the experience goal evaluation is missing from the scope of the present research due to production delays, I managed to answer most of my research questions and outline a rough process for setting experience design goals in mobile games.

RQ 1: How can experience goals be set and evaluated in the context of mobile games?

In my first research question, I aimed to elaborate on setting experience goals in mobile games. The first question to answer before choosing the source of inspiration for experience goals should be, "Are you creating a new product or improving the existing one?"

In contrast to the context of industrial work environments, the design of a game offers extensive control over the interactive elements and environment that the player engages with. While developing a new mobile game, the designer can use numerous inspiration sources to define experience goals. These sources can range from game-specific experiences, such as the state of flow, immersion, emotional response, the degree of challenge, and the progression of skill development (Moizer et al., 2019). Additionally, UX

approaches, including theoretical frameworks, empathetic understanding of users, technology, brand, and company vision, can serve as starting points for the initial design of experience goals.

The objective of the present research focused on improving the existing game and the previously accumulated feedback limited the sources of inspiration for experience goals. Out of five UX approaches described by Kaasinen and colleagues, I focused primarily on theory and empathy (Kaasinen et al., 2015).

Theory in the context of inspiration for experience goals refers to existing scientific knowledge in the UX field that helps narrow down the scope of relevant experiences and evaluation methods. In the present research, I referred to player motivations identified based on previous audience research (Yee, 2016).

Using empathy as an approach means deriving inspiration from understanding users' needs, feelings, and problems by conducting user research. In this study, I conducted a secondary analysis of existing internal feedback, player store reviews, and community feedback. Additionally, I performed two rounds of usability evaluation.

The secondary and primary analysis provided a clear understanding of players' problems and positive aspects of the game. Next, I examined how the core problems and things that players enjoy manifested in players' user experience and what feelings and emotions they evoked. I identified three high-level experience goals by summarizing positive and negative feedback: action, immersion, and approachability.

RQ 2: How can experience goals guide the user experience improvement and re-design work?

The second research question addresses the practical implications of experience goals guiding the process of improving the user experience in the game. The high-level experience goals produced in this research, immersion, and approachability pierced the entire game affecting multiple features. These goals helped to align expectations from each feature and maintain consistency throughout the game, ensuring that the game addressed the players' needs. The significance of experience goals to the game development process was in creating a shared understanding of the purpose of the feature improvements.

Such high-level experience goals affect a large scope of features in a game that requires prioritization. I focused on the features that most players interacted with on a regular basis during the first minutes after downloading the game.

Out of all features, the dialogues stood out as a feature aiming to impact players' engagement with the characters. However, players spent the least time on it. With the development team, we created a new dialogue design tackling immersion and approachability experience goals. On a design requirement level, immersion meant creating a new visual style featuring characters' emotions and facial expressions and using images to illustrate exciting moments in the story. Ability to skip dialogues and to review the dialogue from the beginning aimed at addressing approachability in the game.

Before evaluating immersion and approachability goals, I conducted an initial comparative prototype testing to observe players' interactions with the current dialogue feature, first impressions of the new version of the dialogue design, and potential usability issues. This evaluation provided positive signals about the direction choice in the dialogues' visual design. It helped to identify a sense of control as a feature-specific experience goal in addition to high-level goals, immersion, and approachability.

Immersion, approachability, and sense of control require another evaluation round to measure how well these goals are addressed in the new design version of the dialogue feature. The test environment and the procedure should accommodate the evaluation of user experience developing over time. Therefore, I designed a weeklong series of remote unsupervised playtests accompanied by a diary study for the next iteration outside the present research's scope.

RQ 3: What are the practical guidelines for experience-driven design in mobile games?

In this research, I combined and fleshed out guidelines for setting experience goals from several research articles (Kaasinen et al., 2015, Väättäjä et al., 2015) and used general principles of iterative design to define a step-by-step process. The practical guidelines for applying experience-driven design in mobile games can be visualized as a series of steps (presented in Table 15):

Table 15. *Experience goals setting up step-by-step process.*

Step number	Description
1.	Decide if experience goals are designed for a new game design or improvements to the existing game
2.	Use relevant sources of inspiration for formulating experience goals that include theory, empathy, brand, technology, or vision. Perform secondary analysis of existing information to understand players' problems and conduct additional user research.
3.	Analyze the data and focus on detecting how problems reflect in user experience. Consider positive experiences as supporting information for formulating the experience goals.
4.	Create a short set of high-level initial experience goals based on the previously discovered data.
5.	Work on new design concepts inspired by the selected experience goals. Define how to measure if the experience goal is achieved.
6.	Refine the concept and perform an experience evaluation to measure how well the selected experience goals are met.
7.	Use evaluation findings for the next design iteration and ensure that the design meets the experience goals.
8.	Implement the new feature into the game and keep monitoring the player feedback.

6.2 Reflections on the research process and findings

The empirical part of the present research concentrated on the initial phases of the player's journey, such as discovery and onboarding, leaving the development of long-term user experience unobserved. The initial prototype evaluation helped identify a sense of control as a specific experience goal crucial for the experience during the game's onboarding phase. For developing high-quality dialogue feature that ensures the achievement of overarching experience goals such as immersion, approachability, and discovery of other goals specific to certain stages of the player journey, a further evaluation must cover scaffolding and endgame phases (Chou, 2015).

Moreover, the comparative prototype test results hinted at an interesting relationship between instrumental and non-instrumental qualities that the participants highlighted about the dialogue feature after the initial experience. According to Hassenzahl (2007) and Karapanos et al. (2009), non-instrumental qualities are the more influential during the initial experience with the product. Besides highlighting such non-instrumental qualities as the visual design of the characters and speech bubbles, animation, and chunking of the dialogue texts, the participants paid attention to text accessibility, the ability to review dialogues from the beginning, and sense of control over the dialogues, which can be identified as instrumental qualities. The next evaluation will be conducted as a longitudinal study in which I can review the influence of instrumental and non-instrumental

qualities of the game on the players' user experience to ensure that this observation was more than just a fluke in the data.

Initially, I planned to perform the experience goal evaluation as part of this research. However, project-wide constraints related to the development team's learning curve of experience-driven design, the broad scope of features affected by immersion and approachability goals, and production delays impacted the overall schedule of the evaluation efforts.

In autumn, when I started running the first weekly workshops with the team, I received feedback that discussing abstract concepts such as experience-driven design for a brief time felt difficult. Team members had trouble remembering the previous discussions, new concepts, and action points. Team meetings were short and rare due to the busy schedule of the team members, who spent most of the time on hands-on tasks developing the game. It affected the start of the project scoping. Since only UX was actively using and referring to immersion and approachability goals while proposing changes to the features and suggesting priorities, the planning work took longer than expected, and feature priorities were unclear months into the project. Thinking back, a more effective way to onboard the development and production teams with a new design approach would be an intensive weeklong design sprint a few weeks before the development kick-off.

On the other hand, an experience-design approach required changes into the production process. Frequent prototype testing with players must be added to the roadmap of the feature release. Otherwise, the development process takes all available time and there is no room for design adjustments based on user feedback.

Reflecting on the challenges I faced in this research, it became evident that without groundwork on communicating the purpose and value of UX work, spending time on introducing new concepts to other disciplines and stakeholders' innovative methods proved useful in other contexts might fail to provide fruitful results. As a UX professional, I will continue evangelizing the UX approaches that have the potential to improve the players' experience in mobile games drastically, make sure that the methods are coordinated with other objectives of the studio, and put extra effort into proving the value of these methods to the rest of the team.

6.3 Future work

As previously stated in earlier chapters, further work is needed for evaluation of experience goals in dialogue feature that include immersion, approachability, and a sense of control. For the preliminary evaluation of the dialogues prototypes, I used a combination

of objective, subjective, and subjective-objective methods (Yu et al., 2018). The objective methods included the use of game analytics to estimate the usage of the dialogues feature by the players. Subjective methods such as post-task questions, and subjective-objective method, such as observation of the participants' interactions with the prototype, were used during the test.

The experience goal evaluation will be conducted as a weeklong longitudinal study. The evaluation will comprise a series of remote unmoderated playtests accompanied by request to keep a diary of participants' reflections on experiences with the game, particularly with the game's narrative. The test setup aims to ensure a safe and comfortable environment for the participants and observe how the initial experience and experience goals evolve over time. In case of inconclusive or contradictory results, the evaluation can be supported with interviews focusing on unclear findings and gameplay video snippets to help the participants recall the experience in question (Petersen et al., 2017).

Furthermore, the present research can be expanded toward narrative techniques and narrative design in mobile games. Another important addition is a dialogue-specific visual accessibility evaluation of the feature, preferably with a panel of players with a disability.

This research shows that experience-driven design could successfully be applied to the creative industry, particularly mobile game development. Future research on experience-driven design in mobile games should further explore the methods to enhance emotional engagement and immersion through narrative, rich audiovisual experiences, meaningful content, and personalization of user experience based on players' preferences and goals.

7. CONCLUSIONS

The main purpose of this research was to find an approach for setting overarching experience goals that support a coherent user experience and provide UX designers working on mobile games and other interactive media products with clear starting points and guidance on applying the experience-driven methodology to the creative industry.

The present study provides an example of how the experience-driven design method can be applied to the development of mobile games by using theory and empathy UX approaches as sources of inspiration, setting initial high-level experience goals, and designing the experience goal evaluation procedure.

Using a case of defining the experience goals for the dialogue feature, I demonstrated how immersion and approachability could dictate the design direction and drive the improvement of the existing feature in the game. The design implications of the immersion goal focused on creating a new visual style for the dialogues featuring images illustrating exciting moments in the story, characters' emotions, and facial expressions. An ability to skip dialogues and review the dialogue from the beginning aimed at addressing the approachability goal.

The initial comparative prototype evaluation of the refined design allowed to identify a sense of control as another feature-specific goal critical to the experience of the game's narrative. Sense of control refers to the ability to control the pace of how fast new dialogues appear on the screen providing new narrative content to players.

Unfortunately, one of the critical research limitations is the fact that the evaluation of immersion, approachability, and sense of control experience goals got delayed due to production constraints and will be performed outside of the scope of this research.

The previously discovered evaluation procedure limitations, such as the content of the dialogues in the prototype test, limited prototype functionality, the impact of the test situation on the usage of the skip feature, and ineffective post-task questions, will be addressed in the following evaluation round of the dialogues feature. The next evaluation will be a weeklong longitudinal study conducted as a series of remote unsupervised playtests and a diary study. Additionally, I planned to conduct a visual accessibility evaluation of the dialogue feature to ensure the new dialogue design is readable to a broad audience.

Further research of experience-driven design in mobile games advances understanding of user experience in mobile games and contributes to the development of innovative design strategies that create engaging, enjoyable, and meaningful gaming experiences for players.

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APPENDIX A: SYSTEM USABILITY SCALE QUESTIONS

Evaluate the following statements about the game that you just played on the scale from 1 “Strongly disagree” to 5 “Strongly agree”:

1. I think that I would play this game frequently
2. I find the game unnecessarily complex.
3. I think the game is easy to play.
4. I find the various functions in this game to be well integrated.
5. I think there is too much inconsistency in this game.
6. I imagine that most people would learn to play this game quickly.
7. I find the game very awkward to play.
8. I feel confident playing the game.
9. I need to learn a lot of things before I can play this game.

APPENDIX B: COMPARATIVE PROTOTYPE TESTING SCRIPT

Test procedure

The host welcomes the test participants and goes through the instructions for the test. Ask a few background questions to break the ice and make the participants more comfortable. Ask for permission to record the audio of the test and ask for consent. Explain that audio records will be destroyed after the analysis phase.

Instructions to the participants:

In this test we were hoping you could play the same way as any other game you might download on AppStore or Google Play. We are not evaluating you, so there are no right and wrong ways of playing the game.

Participation in this test is 100% voluntary. Please let me know whenever you need to take a break or stop the entire session. You don't have to explain the reason.

Today you will try two prototypes of the game. The prototypes are focused on storytelling, so we will skip the actual gameplay. You will get to see 2 dialogues in each prototype.

Start the prototype and follow the actions that the game provides.

When you reach the forest, we will continue to the next task.

You can ask questions or help during the test. I will try to assist as much as I can. However, I will not be providing instructions on how to complete the tasks themselves. I want to observe how you approach them and learn from your experience.

Test tasks

Task 1: play through two dialogues: the first dialogue in mission 1 and another in mission 5.

Background questions

Before we start the test I would like to ask you a couple of background questions:

- How familiar are you with the TV program that the game is based on?
- Have you played the game before? If yes, how far along are you in the game?
- In the past 30 days, how many times have you played mobile games?

Questions during prototype testing:

1. How did you feel about the dialogues that you just played?
2. What kind of emotions do you think the characters have in the story?
3. What do you think about the story itself? Would you be interested in learning more?
4. Have you encountered any problems or annoyances?
5. Do you have any questions at this point?

Questions after prototype testing:

1. How did you feel playing through the story/ reading dialogues?
2. What kind of differences did you notice in these prototypes?
3. What things were the most memorable in both prototypes?
4. What was easy and what was difficult in each prototype?
5. If you would imagine playing the game daily, what way of presenting the dialogue would you prefer A or B?