Faculdade de Design, Tecnologia e Comunicação
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SPELL: A COOPERATIVE LANGUAGE LEARNING BOARD GAME FOR CHILDREN

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Projeto apresentado ao IADE - Faculdade de Design, Tecnologia e Comunicação da Universidade Europeia, para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Design e Cultura Visual realizado sob a orientação científica do Doutor João Batalheiro Ferreira, *professor auxiliar* do IADE - Faculdade de Design, Tecnologia e Comunicação da Universidade Europeia.

To my parents. For always believing in me, supporting me, and allowing me to follow my dreams.

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palavras-chave

Design visual, teoria do design de jogos, aquisição de linguagem, aprendizagem lúdica, jogos de tabuleiro.

resumo

Perante um mundo cada vez mais globalizado, existe uma crescente necessidade de métodos eficazes para a aprendizagem de uma segunda língua, especialmente entre crianças. Neste contexto, a aprendizagem baseada no jogo oferece novas oportunidades para combinar educação e diversão. Esta investigação explora de que forma o design de jogos de tabuleiro pode facilitar a aquisição da língua inglesa como segunda língua em crianças com seis anos ou mais. Este estudo tem como objetivo compreender como pode ser concebido um jogo de tabuleiro educativo para promover o desenvolvimento da segunda língua, ao mesmo tempo que investiga o papel da aprendizagem através do jogo na motivação e envolvimento das crianças, bem como os benefícios sociais da interação presencial em jogos analógicos.

Este projeto segue uma metodologia de investigação através do design, começando com uma fundamentação teórica baseada em teorias da aquisição de linguagem, da aprendizagem e do design de jogos. Segue-se uma análise comparativa de jogos educativos existentes, prototipagem iterativa e sessões de testes com crianças. O resultado desta investigação é o desenvolvimento de **Spell**, um jogo de tabuleiro que utiliza narrativa, colaboração, informação oculta e desafios de vocabulário para promover a aprendizagem linguística num ambiente envolvente e lúdico.

keywords Visual design, game design theory; language acquisition; play-based learning, tabletop games.

abstract

Faced with an increasingly globalized world, there is a growing demand for effective second-language learning, particularly among children. In this context, game-based learning offers new opportunities for combining education and play. This research explores how tabletop game design can facilitate the acquisition of English as a second language for children aged six and older. This study aims to understand how a tabletop learning game can be designed to enhance second language development while also investigating the role of play-based learning in motivating and engaging young learners and examining the social benefits of face-to-face interaction in analog games.

This project follows a research-through-design methodology, beginning with a theoretical framework drawing from language acquisition theory, learning theory, and game design. This is followed by a comparative analysis of existing educational games, iterative prototyping, and playtesting sessions with children. The outcome of the research is the development of *Spell*, a tabletop game that uses narrative, collaboration, hidden information, and vocabulary challenges to foster language learning in an engaging, playful environment.

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PART I - Introduction

Chapter I – Problem Statement

1.1 Problem

Language acquisition is growing with today's globalization. Especially English stands out as a critical second language and is taught in most countries from a young age on. However, in some countries, for instance Germany, Spain, France, or Italy, many children barely come into contact with the English language, outside of school. This is partly due to the widespread use of translated media, which limits the opportunities to hear and use the language in everyday situations (Jacobs, 2022).

Classroom teaching is often based on memorization, for instance, memorizing vocabulary lists, which can be boring, monotonous, and uninspiring for students. These traditional methods do not always stimulate interest or encourage deeper engagement. Research shows that learning through play is far more effective, especially for young learners (Paatsch et al., 2023). According to Paatsch et al., play not only increases motivation but also helps children retain what they have learned and apply it more naturally. As Paatsch et al. (2023, p.5) note, "play is at the very heart of childhood." After all, as their work emphasizes, play is an essential part of how children explore the world and build new skills.

Considering the above-stated conditions that point to the positive effect of play on language acquisition, it can be stated that the primary assumption of this project is to answer the following research question:

- How can a tabletop learning game be designed to improve English as a second language for children aged six and older?

In this regard, the object of study consists of the element of play as a learning instrument for children in the form of a tabletop learning game. The game will promote English language

acquisition through interactive, analogue play that encourages communication, creativity, and active learning. Unlike digital platforms, tabletop games promote face-to-face interaction and collaborative problem-solving, helping children build both language and social skills. To support this investigation and inform the design process, a number of existing games will be analyzed, namely Monopoly, Catan, Santorini, Wer War's, Dixit, Carcassonne, Scrabble, and Pictionary.

These case studies will help identify the game mechanics that most effectively support engagement, communication, fun, and educational value.

1.2 Research Question

How can a tabletop learning game be designed to improve English as a second language for children aged six and older?

1.3 Objectives

The main objective of this research is to explore the potential of tabletop games to help improve language acquisition for children.. Additionally, two other objectives were defined.

- To investigate how play-based learning influences motivation and engagement in second language acquisition among children.
- To examine the social benefits of face-to-face interaction in analogue games for supporting English language development.

1.4 Relevance

The relevance of this research relates to the importance of Multilingualism in today's society. English as a second language is especially important in this globalized world and plays a role in international relations and career opportunities. For instance, in Germany, although English is taught in school, it is not used in daily life, and therefore, opportunities to practice are limited. For example, most movies and shows are dubbed into German, reducing the exposure to authentic English input, and the same is true for countries like Spain, Italy, or France (Jacobs, 2022). This lack of exposure to the language can hinder language retention and fluency (Almeida & Costa,

2014). Moreover, research has shown that early language acquisition offers cognitive and social benefits (Pinker, 1998), which makes it even more relevant to develop a method to foster language acquisition for children.

Chapter II – Theoretical Framework

2.1 Language Acquisition

2.1.1 Language Acquisition Theory

To develop a language game, it is necessary to understand how language acquisition works. Language is a cognition that makes us different from animals (Lemetyinen, 2023). Researchers searched for answers on how language works and how we learn it, and several theories are important for gaining a better understanding of language acquisition.

Language acquisition refers to the way people learn their first or second language, which includes mastering grammar, vocabulary, and communication skills. This learning typically begins in early childhood but can continue through a person's lifetime, influenced by exposure, social interaction, and cognitive development. Skinner was among the first to scientifically explain how language is acquired. Skinner's behaviorist perspecrgetive emphasizes the role of the environment in language learning. According to the author, language is acquired through imitation, reinforcement, and conditioning. By copying adults and receiving positive feedback, children gradually strengthen their correct use of language (Lemetyinen, 2023).

Contrary to Skinner, Noam Chomsky (1965) argues that if language acquisition were determined solely by linguistic input, children would not be able to learn the tools they need to process an infinite number of sentences. Chomsky developed the nativist theory of language development, which states that humans are born with an innate ability to learn a language. This theory suggests that children naturally possess the grammatical principles needed to learn any language. Chomsky's Universal Grammar theory supports this, stating that all human languages share common underlying structures.

According to contemporary research, children use general cognitive principles to learn. Also, psycho-linguists are questioning the universal grammar, saying it is biologically and evolutionarily implausible (Lin, 2017). They state that children learn from repeated patterns that they can recognize and use, which suggests language acquisition is a gradual process of pattern learning (Lemetyinen, 2023).

2.1.2 The Language Instinct

In his book "*The Language Instinct: How the Mind Creates Language"*, Steven Pinker (1998) argues, similar to Chomsky, that humans have an inherent ability to acquire language. This allows children to learn languages in a natural way. Pinker states that our brain is a product of evolution and has evolved primarily to process valuable information from the environment. He emphasizes the brain's role in responding to the environment, which is crucial for human survival. For instance, the brain contributes to reproduction by learning from experiences and creating strategies or social bonds.

Moreover, the brain's evolution has also played a significant role in the development of culture. When cognitive abilities developed, humans began to share knowledge, which led to the creation of languages, traditions, and social norms. Culture influences brain evolution by adapting to environmental changes, learning and modifying cultural practices, and engaging in social interactions. Engaging in social behaviors requires advanced cognitive functions, such as communication. A characteristic of human culture is the ability to pass on knowledge and skills across generations. This cultural transmission requires specific mental skills, such as imitation and teaching, which can influence brain development.

Pinker also explores how language use reflects deeper cognitive abilities in children. He explains that even young children invent their own metaphors, using ideas about space and movement to talk about things like ownership and cause and effect. This suggests that children are not simply imitating adult language, but are actively engaging in complex and creative language use that reflects broader cognitive development. Such a metaphorical understanding supports the idea that language acquisition is not just about memorizing words, but also about building a mental framework for abstract thinking.

In addition to cognitive development, Pinker also explains how the brain is prepared for language from an early stage. He explains that the brain's neurons are wired during pregnancy based on genetic instructions, creating early pathways for language. These connections are then shaped and improved through experience. This shows that the brain is ready to learn language even before a baby is born. However, for children to develop language correctly, they need to interact with their environment actively. When they do this, their brain activity adapts and becomes more accurate, which helps them to understand and use language better.

These biological foundations of language acquisition, outlined by Pinker, complement Piaget's earlier theory of cognitive development (1952), which explains how children's thinking skills develop over time and influence their ability to use language effectively. Jean Piaget, a Swiss psychologist, widely recognized for his work on how children's cognition develops, identified four stages of cognitive development. His studies and observations on children showed that children are born with limited capabilities, and their cognitive abilities grow over time.

2.1.3 How learning happens

To understand how learning happens, it is important to understand the brain and how it processes memories. Kirschner and Hendrick (2020) describe the processes of our brain as follows: When our brain receives signals from the environment, we can store information from those signals. This information can be processed on three different levels. The structural, acoustic, and semantic levels. Depending on the level, the information is processed, deep or more superficial. The deeper a signal is processed, the more likely we are to remember that information. For instance, if you get introduced to someone and immediately forget their name afterwards, it is because of the processing in a shallow phonemic way. You are more likely to remember the name if you relate it to something. For example, if the name was Baker and you related it to the bakery next door, with the delicious bread, it would make it more likely to remember it. This shows the depth of processing has a greater impact on memory retention than simply intending to learn. In other words, meaningful engagement with the material is more effective than surface-level studying, even if the learner is motivated. For instance, learning through writing leads to deeper processing, but even more effective is a variety of ways to process the information. What students pay attention to determines what they learn.

Evolution plays a crucial role in how deeply we process information as well. Kirschner & Hendrick (2020) state that the world is all about survival, and therefore, what is important for our survival, we will remember. For example, children learn to talk in order to survive. Furthermore, children are most likely to learn a language through interaction. The Child's cognitive functioning is influenced by their task-specific knowledge and social experience. They learn a language by interacting with their family and peers. The context of the environment and social experience plays an important role. That is why cultural background also plays a role in how knowledge is

understood. Learning can, therefore, not be separated from the social and cultural contexts in which it takes place. Techniques for social learning are imitation, role play, and peer teaching.

Likewise, Craik and Lockhart (1972) proposed a depth of processing model to explain variations in how well information is remembered. This model focuses on the idea that the information we perceive is processed at different levels. They state that many theorists agree that stimuli must be processed at different levels for fast processing. At first, simple physical features, like shapes, brightness, or sounds, are analyzed. Afterwards, the brain connects the new information based on recognizable patterns. Only if something is recognized does it go through a deeper mental processing. Craik (1972) suggests that depth does not mean how much information we analyze, but rather how much meaning we actually understand. The second part of the theory explains that memories are stored after creating a memory trace through the brain, which happens after recognizing something. Craik and Lockhart (1972) state that the depth of information processing is decisive for how long a memory remains in the mind.

Therefore, longer-lasting memories are caused by deeper thinking, which also leads to deeper learning and recall. This makes sense because our brain focuses on understanding meaning. Details from the first processing stages, like basic sounds or shapes, will not be remembered. Craik and Lockhart (1972) also suggest that there are no strict stages but rather a continuous path where the memory is processed. Craik and Lockhart (1972, p.165) explain, "After a word is recognized, it may trigger associations, images or stories based on the subject's past experience with the word". This process helps create a longer-lasting memory. As a result, the long-term memory is created by a deeper thinking process about meaning and connections, while the short-term memory results from simple sensory processing, such as shapes or sounds. According to Craik and Lockhart, there are three ways to process information. Structural processing (shallow) focuses on what words look like, for example, their font, color, or size. The phonemic processing (less shallow) focuses on how words sound or are spelled. The orthographic processing (shallow) focuses on encoding the shape. Shallow processes often repeat information and use maintenance rehearsal to keep the information in the short-term memory.

Deep processing, on the contrary, focuses on understanding the meaning of the information. Through elaborative rehearsal, information gets connected to other memories and experiences, which helps create a longer-lasting memory. A number of conducted experiments by Craik and

Tulving (2015, as cited in Craik & Lockhart, 1972) demonstrate that how deeply material is processed plays a more significant role in learning than the simple intention to study.

2.1.4 The Role of Visuals

Building on the idea of depth processing, Clark and Paivio (1991) developed the "Dual Coding Theory" (DCT), which differentiates the memory system into a nonverbal and a verbal system. According to this theory, a learner's memory differentiates between these two types of information. They explain the theory as "an empirically well-founded characterization of the mental processes that underlie human behavior and experience" (Clark & Paivio, 1991, p. 150). DCT helps explain various cognitive mechanisms and serves as a foundational concept in educational psychology. The theory suggests that connections can form within both systems. Words can be associated with other words, just as images can be linked to smells or other images. The verbal system includes verbal codes that can be visual, auditory, or articulatory. In contrast, the non-verbal system encompasses images, shapes, environmental sounds, and emotions associated with sensations. These two systems can also connect through what are known as referential connections. In this process, an image can evoke specific words, or conversely, a particular word can trigger an image. Some words may even provoke negative visual associations in children who have established links between certain words and non-verbal reactions.

Another type of connection is the associative connection, which links representations within the verbal and non-verbal systems. In the verbal system, words form connections to other semantically related words, while in the nonverbal system, visual images are linked to other related images. These associative structures improve memory retention, suggesting that using both systems together can improve one's ability to remember information. DCT also highlights the importance of providing concrete examples to learners. Concrete objects are more appealing to the imagination and easier to process than abstract concepts. For instance, it is simpler to visualize a tree than the concept of freedom. Concrete images are more likely to come to mind, and using examples can help break down abstract ideas, facilitating faster understanding (Clark & Paivio, 1991).

While the dual coding theory explains how information is stored and recalled using the nonverbal and verbal systems, the cognitive load theory focuses on how much information our working memory can handle. Developed by John Sweller (1988, as cited in Kirschner & Hendrick, 2020), this theory highlights that our brain has limited capacity for processing new information.

According to Kirschner & Hendrick (2020, p.15), “Mental effort is about how hard a person tries to actively process presented information. It is a combination of perceived demand characteristics (how complex the task is combined with the level of expertise of the person carrying out the task), perceived self-efficacy (the extent that one believes that (s)he is capable of performing in a specific manner to attain specific goals), and level/ depth of information processing (the degree to which a person encodes/recodes a source) such that the first two influence the last which determines the amount of invested mental effort.” Thus, the method of problem-solving will be frustrating, slow, and confusing if the mental load is too much because of missing knowledge or guidance. Sweller (as cited in Kirschner & Hendrick, 2020) concludes that learning how to solve problems effectively requires explicit teaching of both facts and procedures before asking students to apply them. This approach is also essential for developing skills such as communication, discussion, and writing.

2.2 Play

Play is essential for learning because it allows individuals to explore, experiment, and discover in a low-risk, intrinsically motivating setting (Vygotsky, 1978). It gives children in particular the opportunity to interact with their surroundings, experiment with ideas, and understand difficult concepts through active experiences. Rather than being passive recipients of information, learners become creative thinkers and problem-solvers through play. It also supports social engagement and lays the groundwork for cognitive development. Since play removes the fear of failing, it promotes independent learning that builds knowledge.

2.2.1 Huizinga - Homo Ludens

According to Huizinga (1955, p. 1), "Play is older than culture". He states that the concept of play does not only belong to humans; even animals play. Play is not connected to a specific culture or time but brings joy, fun, and a sense of purpose. Therefore, play is not just a biological reaction but has a deeper meaning. Huizinga explains that scientists have different ideas about why we play, such as using up extra energy, practicing life skills, relaxing, or expressing emotions. However, all those explanations miss the joy and meaning, which is the real essence of play.

Moreover, play connects to the imagination and is expressed through language, yet it can still be serious without being boring. Huizinga emphasizes that culture, language, and society develop and grow out of play; therefore, play and culture are deeply intertwined (Huizinga, 1955). He stresses that play is not just part of culture; it is fundamental to it.

Although play is a universal phenomenon, Huizinga (1955) emphasizes that its meaning and interpretation are shaped by the language and historical context of each culture. Some cultures distinguish different forms of play using multiple terms, such as games, performances, and competitions, while others use a single word that covers different meanings. As Huizinga puts it, defining play is not as straightforward as using a word like "hand" or "foot," which most languages have as a single, shared concept. Instead, he notes: "For it is arguable that one language has succeeded better than others in getting the various aspects of play into one word" (Huizinga, 1955, p. 29). This means that our idea of play depends on the word we use for it, and its context can vary across cultures.

The word play does not originate from science but from the creative development of language throughout history. The idea of play that is familiar and closest to most European languages can be translated into the English word “play” (Huizinga, 1955). Based on the English term, Huizinga (1955, p. 28) defines play as follows: “play is a voluntary activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy and the consciousness that it is ‘different’ from ‘ordinary life’.”

Therefore, the way play is defined seems to include all kinds of activities. For instance, physical play, gambling, animals that play, made-up games, and performances. Huizinga emphasizes that “the category “play” [is] one of the most-fundamental in life” (Huizinga, 1955, p. 28). He argues that play forms the foundation of many aspects of human life, including law, war, poetry, and ritual.

However, in other cultures, the word used for play can be quite different, resulting in different interpretations. The nominalism perspective states that each culture understands “play” only through the words available to them, which can be multiple words. Some cultures do not even have one collective word, such as the word “play” in the English language. Despite these linguistic differences, Huizinga insists that the function of play remains vital. Even if a universal concept of play is not defined in every culture, the role of play is essential (Huizinga, 1955).

2.2.2 Learning through Play

Play can be defined as “the heart of children's childhood” (Paatsch, Casey, Green, & Stagnitti, 2023, p. 5) and influences children's learning and development. The authors state that play engages multiple brain areas and is a social act. Social interaction and the child’s cultural environment greatly influence their learning development. Also, Vygotsky (1967, as cited in Paatsch et al., 2023) claims children learn through play, especially when they play with a more competent other. This highlights the importance of social interaction for the child’s learning and development, as well as their social and cultural environment.

Paatsch et al. (2023) also describe various types of play, such as functional play (using objects as intended), construction play (building structures), pretend play (using symbols in play), games with rules (like tag or video games), auditory play (listening to music), physical play (climbing), sensorimotor play (playing with sand or water), language play (playing with words), and visual

perceptual play (doing puzzles). Play is described as fun, voluntary, and spontaneous. It exists on a spectrum ranging from free play (child-initiated) to direct instruction (adult-directed).

Pretend play, or thinking play, offers a rich environment for fostering intellectual, emotional, social, physical, and cognitive development. It involves using imagination and creating stories, roles, and scenarios. This form of play helps children learn social skills, language, and self-regulation (Paatsch et al., 2023).

Vygotsky (1967, as cited in Paatsch et al., 2023) suggested that pretend play forms the foundation for children's cognitive and linguistic processes. It generates a zone of proximal development (ZPD), which provides opportunities for social language use and meaningful dialogue. Extensive research findings demonstrate the connection between pretend play and children's development in the areas of language acquisition and later reading and writing skills. These include improvements in grammar (syntax), meaning (semantics), sound awareness (phonology), social language use (pragmatics) and narrative skills.

In connection with this, Paatsch et al. (2023) explain that the brain relies on experience, meaning the child’s experiences influence the developing brain. Newborns have few connections between their brain cells; those connections develop through positive and responsive interaction. Therefore, responsive teaching can impact the child’s rational brain through these interactions. Improving the connections between the different regions of the brain ensures that the child can better control their emotions and think through problems.

Another important point the authors mention is that children need to feel safe before they can really learn or play. A deep sense of security is rooted in human nature. Teachers are responsible for creating this sense of safety so that children can learn more effectively. This can be achieved through smiling, speaking kindly, and using an open body posture (Paatsch et al., 2023).

Furthermore, play is not only a crucial measure for creating social joy and positive brain development but also one of the primary social urges in mammals. It helps develop social intelligence. It also creates active engagement and social interaction. Children are better focused when they actively participate in play. When the content makes sense to them, it supports better retention. Thus, play encourages children to problem-solve, think creatively, and develop both social skills and critical thinking. Creative thinking is closely linked to problem-solving and well-being. It involves discovering new possibilities and trying new approaches. Play is a form of

creativity, as well as storytelling. It is about dealing with the unexpected. Pretend play especially reflects creativity, as it involves the same process of cognitive flexibility. Both positive and negative emotions can foster creativity, as the brain searches for alternative solutions. Emotions like joy and curiosity also support the learning experience. According to Siegel (2012), integrating emotions and cognition leads to greater flexibility, adaptability, creativity, and stronger social connections (Paatsch et al., 2023).

2.3 Game Design

Tabletop games are a powerful way to *learn through play* by combining structured rules with open-ended interaction (Schrier, 2016). Games encourage players to think strategically, collaborate, and make thoughtful choices within a tangible social setting, aligning with Vygotsky's theory of the zone of proximal development we discussed earlier. The physical components of tabletop games, such as boards, cards, and tokens, support hands-on engagement, which deepens understanding. In playing together, the participants engage in dialogue, reasoning, and shared reflection, creating opportunities for communication and critical thinking. Finally, tabletop games often simulate real-world systems, challenges, or stories, offering a space for experimentation and learning. Children benefit from those experiences because playing a game turns abstract concepts into a concrete experience.

According to Engelstein (2020, p.1), games "are activities in which players agree to place obstacles in the way of achieving a goal." In other words, games are constructed, artificial creations that must be designed. Therefore, the game designer's role consists of constructing a framework through rules, systems, and choices that transform free play into engaging activities with an end goal. As a result, Engelstein (2020, p.2) concludes that "games allow players to participate in the creation of the experience, to make choices, or to be subject to random forces outside of their control."

2.3.1 Core Structures of Tabletop Games

This section draws on the framework outlined by Engelstein and Shalev (2022) in *Building Blocks of Tabletop Game Design*, which highlights how structure transforms play into a functional game. One of the first decisions a designer has to make is whether the game should be competitive or cooperative, thus determining the type of game. In competitive games, only one player can win, and each player's entry to the game has to be with equivalent chances. In contrast, cooperative games require players to play together to achieve a common goal. This type of game has lower barriers for new players to enter the game, therefore making cooperative games more accessible. According to Engelstein & Shalev, the introduction of structure converts play to a game. A central structural element is the concept of a turn, which defines when and how players can interact during the game. The gameplay is significantly affected by different turn structures. A turn can be broken

down into taking several actions or steps, while a round consists of multiple turns taken by different players. Some games also work with phases, which are more specific and can be identified with a name, as for instance a “Scoring phase”. Unlike turns, which always follow the same basic structure, phases can be different from each other.

Another critical aspect of structure involves player actions. Engelstein & Shalev (2022) emphasize that games require players to take action in order to progress. These actions can rely on a player's luck or skills. The difference from other activities is that a player must act. An action can be described as a series of steps in a turn. The game can gain a specific feel through the actions that are integrated into the game. Actions have to be balanced, as they should not be too overwhelming, but at the same time, the game should be active enough.

2.3.2 Uncertainty in Game Mechanics

Moreover, some actions involve uncertain outcomes, which introduce randomness into the gameplay experience. Engelstein & Shalev (2022) differentiate between various types of uncertainty in action resolution. One type is performative uncertainty, where the outcome is determined from the player's ability to perform an action, such as memory recall or speed.

Another type is output randomness, also referred to as chance interference, where the outcome is influenced by chance. For instance, actions such as finding hidden objects or selling goods in a market require some form of randomized resolution, which adds unpredictability and tension to the game. Furthermore, turning a card, rolling a dice, or even the opponent’s next move contributes to uncertainty in the game, which influences the player's experience. This uncertainty can create chaos, but it can also keep the game dynamic and engaging. Engelstein & Shalev (2022) note that input randomness, where a random event happens before the player's decision, allows the player to make a more informed and strategic decision. In contrast, the previously discussed concept of output randomness forces players to make a high-stakes decision before knowing the outcome.

Therefore, as Engelstein and Shalev (2020) explain, randomness becomes part of the strategy when players are shown the outcome of a random event before they make their decision, something they must react to rather than bet on. This approach, known as input randomness, contrasts with output randomness, where decisions are made before the random outcome is revealed.

Because uncertainty strongly shapes the player experience, game designers often incorporate mechanisms to manage it intentionally (Engelstein & Shalev, 2020). This can include controlling how cards are distributed or how many dice are rolled. Most successful games rely on more uncertainty, which results in fewer needed skills, making the game more accessible to different people. However, what matters most is that the game has a clear goal and structure so that players can deal with the uncertainty.

2.3.3 Hidden Information and Bayesian Reasoning

While randomness and player skill are important elements of uncertainty in games, hidden information leads to a different kind of strategic complexity. Many tabletop games require players to make decisions based on incomplete knowledge. This resonates with the structure of Bayesian games, which was introduced by Harsanyi (1967–1968) and explained in Tadelis (2013). Such games incorporate the possibility that players could be of different "types". According to Tadelis, in Bayesian games, players have to make decisions based on guesses and probabilities due to hidden information like their opponent's strength, resources, or goals. There are two types of hidden information: the player type and hidden strategies. Players are assigned a different "type", such as a character, or players may have different strategies that are not visible, such as a hidden trap on a board. Examples of games that rely on the player's reasoning about hidden types are *The Resistance* and *Werewolf*. Moreover, Tadelis assumes that players are rational, trying to make the best choices for themselves, while also guessing what others might do. This results in much interaction between players. Tadelis introduces the concept of "Nash equilibrium", in which all players believe they are executing the best strategy, given their beliefs about others. They will reach a point where no player can gain by changing their strategy.

2.3.4 Player Experience

Breault (2020) defines game design as a craft or skill that has to be developed over time, and the player's experience should be the central point of the game design. "Game design is the art of crafting the player experience" (Breault, 2020, p. 9), meaning all design choices, gameplay mechanics, and the story should be based on how it will impact the player. Therefore, the player should be central to every decision. Breault (2020, p.13) highlights "Always keep the player in mind and think of the experience you're creating for them." In analogue games, it is even more important to keep the player experience as a central point. As Breault (2020, p.77) states, "Analog

games were not made for solo players." Promoting player interaction is essential to the design of board games and card games and should be a top priority for their creators. The social element is also the biggest strength of analogue games. Therefore, a game should consist of a lot of player interaction, and game mechanics should serve that goal.

Moreover, Breault explains that games consist of systems and mechanics. Game systems represent what the player can do, for instance, moving, trading, or puzzle solving. Game mechanics, on the other hand, represent how the game system works. Therefore, systems are large-scale aspects" (Breault, 2020, p.13) of a game, while the mechanics are detailed explanations of those systems.

Another game design concept that supports player engagement is maintaining a flow state in players. In this context, flow refers to "a feeling of intense engagement with an activity" (Breault, 2020, p.14). This idea, introduced by the researcher Mihály Csíkszentmihályi in the 1970s, shows that players feel most engaged when the challenge level and skill level progress together.

Storytelling is also an important part of game design. Breault emphasizes that the "story is the foundation that gives context to the player's actions" (2020, p.17) and helps them understand the goal of the game. A written text or dialogue is not always needed for a good story. Some games, like chess, are abstract strategy games that create a story through the figures, strategy, and player movement.

According to Engelstein (2020), the story in a game differs from the story in a book or movie. This is because players take part in the experience in games by making choices. As a result, designers do not fully control what happens. Instead, they must build a system where players interact and create their own experience.

Moreover, Breault states that in analogue games, there should be a balance between chance and player skill. Both are needed, but it is crucial to balance them correctly. Random chance creates tension, for instance, rolling a dice is a basic way to achieve randomness. Rolling the dice also has the advantage of having a physical connection, which will connect players to the game.

Finally, Breault argues that the goal of a game should be more than just "saving the world" (Breault, 2020, p.88). He implies that a goal should be more meaningful, which makes players connect emotionally. Goals like saving a town, rescuing a close friend, or retrieving a stolen puppy from the villain are far more relatable and emotionally engaging.

2.3.5 Common Game Mechanisms and Player Dynamics

Movement is a fundamental mechanism of tabletop design, which is the most common dynamic in games and can be a powerful tool. Engelstein & Shalev (2022) explain that it is as easy as picking up a piece and putting it down again to indicate that a change has occurred. In some games, it is a power to move because of different board areas with different values. Other boards have the same value for all the pieces. Players can be forced to change their plans and handle dynamic situations through movement. Therefore, movement is entertaining and suitable for a variety of game types. It also benefits from the fact that it is a familiar concept that is intuitively picked up by players in every situation.

Moreover, set collection is another concept used in many games and is based on the human tendency to seek patterns and completion. According to Engelstein & Shalev (2022), the fundamental idea behind set collection is that a group of items has a greater value than the sum of the set's parts. With this concept, players can have different goals, which leads to a less aggressive dynamic in the game. On the other hand, it creates tension, as players must guess what others are collecting, which adds the concept of hidden information.

Finally, Engelstein & Shalev (2022) state that a game differentiates itself from other activities through a defined *end game point*, thus having a goal. Who wins the game is decided by who achieves those goals better or faster than others. The game designer must think about ways of determining the winner and triggers for ending the game. Game designers often use Victory Points (VP) as a common method of determining a winner, as awarding points is a simple and effective way to measure progress and determine a winner. Usually, players have multiple ways to collect points. A game that offers multiple activities to gain points gives players more strategic approaches.

2.3.6 Psychology of Player Choices

Engelstein (2020) emphasizes that understanding how players make choices is essential to game design. The player's choice is something that is not directly controlled by the designer. Unlike authors, game designers offer players a set of choices and depend on those choices to drive the game forward, which sets game design apart from other creative fields. Therefore, the designer needs to construct systems that guide the players' behaviors by manipulating their emotional state.

One essential idea in the psychology of player choice is loss aversion. According to Engelstein (2020, p.6), “The prospect of losing something weighs more heavily in our decision-making than the prospect of gaining something.” People feel the pain of loss more strongly than the joy of gain. Therefore, the concept of loss aversion can be used to evoke emotions and influence the decision-making process. According to Engelstein, people are more likely to choose a guaranteed gain over a potentially higher but riskier one. However, they are willing to take risks to avoid certain losses. Moreover, when faced with small probabilities, people tend not to weigh them carefully but base their decision on the possible gain or loss.

Another important concept related to loss aversion highlighted by Engelstein (2020) is the endowment effect, which refers to the tendency of people to value something more if they own it. This was demonstrated in a study by Knetsch and Sinden (as cited in Engelstein, 2020), in which participants were randomly given either a small cash amount (two dollars) or a lottery ticket. When offered the opportunity to swap, very few chose to do so, regardless of which item they had originally received. This suggests that people tend to hold on to what they have, even when there is no rational reason to prefer one option over the other. Similar experiments showed the same results, which shows how the perception of ownership can influence decision making.

Moreover, the framing of the decisions is another crucial factor in players' decision-making. Engelstein (2020) explains that the so-called framing effect can significantly influence how people react and make choices. This principle still draws on the concept of loss aversion. When a choice is presented as a gain, people are more likely to select it. However, if the same choice is framed as a loss, even with the same outcomes, people are less willing to choose it. As a result, the way choices are presented has a strong impact, and individuals tend to prefer positively framed options. Furthermore, while loss aversion seems only to generate negative emotions, Engelstein emphasizes that it can actually be used to create positive moments. With the right design techniques, these moments can drive the game forward and create more emotional engagement with the player.

Beyond loss aversion, the emotion of regret also plays a significant role in player decision-making. Engelstein (2020, p.89) stresses that “One of the primary motivators of human behavior is avoiding regret.” As a result, understanding how players respond to regret can help designers make a game more emotionally engaging. As a designer, there are several important factors to consider when adjusting the emotional significance of a decision: the irreversibility of the decision, its impact on

the course of the game, the number of options available, and the clarity of cause and effect. The more permanent and consequential a decision appears, the more likely it is to be regretted later. On the other hand, games that feature many small, low-stakes decisions tend not to evoke regret as each decision feels emotionally distant from the game's final outcome.

Chapter III - Methodology

The chosen methodology consists of qualitative research, exploring the identified objectives in depth. Additionally, the research-through-design method was used in the project phase of this study.

The qualitative methodology consisted of a literature review and case study analysis, followed by a design phase focused on iterative prototyping and testing. In this context, research through design positioned the design process itself as a central investigative method, enabling iterative development and learning processes by testing the created artefacts. Thus, the methodology was structured across the following stages: literature review, case study analysis, iterative design prototyping, and user testing with both adults and children. It ended with the development of a tabletop English learning game.

The qualitative research reviewed relevant literature on language acquisition, how the mind works, the concept of play, play and education, and tabletop Game design principles and strategies. This review created a theoretical foundation for the project.

Additionally, case studies of popular educational and non-educational tabletop games were conducted. These case studies were analyzed to identify mechanisms in games and understand strategies for game design and user engagement techniques. The selection focused on engaging, playful, and popular games. These examples were incorporated into the design principles and decisions for the present study.

In the final stage, a project was developed for an educational tabletop game. Based on insights from the research phases, an interactive prototype was designed to create an engaging English learning experience. The prototype went through several iterations, being refined through solo testing and pilot testing, followed by user testing sessions involving both adults and children as end-users. These sessions provided valuable qualitative feedback on usability, engagement, and the educational impact. Observations during the testing phases focused primarily on engagement and playability.

After the user testing session, an interview with the primary school teacher was conducted to evaluate the prototype's impact and gather the teachers' views and reflections on the prototype and

the topic of learning through play. The questionnaire contained open and scaled questions to measure user satisfaction and potential areas for improvement.

This methodology combines theory, contextual research, and iterative design to support the development of playful, engaging, and meaningful interventions suited for language learners' needs.

PART II - Results

Chapter IV – Case Studies

To inform the design, eight case studies were analyzed, namely Monopoly, Catan, Santorini, Wer War's, Dixit, Carcassonne, Scrabble, and Pictionary. These included both educational games and commercially successful non-educational games. Case studies were chosen based on the popularity of the game and specific game mechanics.

4.1 Wer war's?

- **Publisher:** Ravensburger
- **Number of players:** 2-4
- **Recommended age:** 6-99 years
- **Playing time:** 30-45 minutes

4.1.1 Game Description

Wer war's? is a cooperative board game developed by Ravensburger and released in Germany in 2007. In 2008, it received the "Kinderspiel des Jahres" (Best Children's Game of the Year) award. Designed to promote teamwork, it combines interactive storytelling with an electronic game component, offering a unique and engaging experience for children and families.

The players have to work together to find out which castle resident stole the magic ring. The goal is to identify the thief and recover the ring before an evil magician reaches the castle gates. Talking animals help the children by revealing clues, after performing tasks for them, like finding their favorite food.

The game board represents a detailed castle layout with ten distinct rooms, each home to a different animal. The game board is illustrated with child-friendly and engaging visuals, and there are many details. Moreover, there are traps in the castle that the players can trigger and a roaming ghost that players must avoid.

The game includes ten suspect cards that players use as reference tools to help identify the thief based on the clues they collect. Furthermore, food items, key tokens, and a physical ring are part of the game components.

An electronic treasure chest controls the gameplay and ensures that every game is different. The treasure chest narrates the story, keeps track of time, and interacts with the player through sound. It also allows the players to talk to the animal, receive clues, and search the different rooms.

The game ends if the players find the ring before 6 o'clock and save the kingdom. They win or lose together, depending on whether they discover the ring in time (2022).[1]

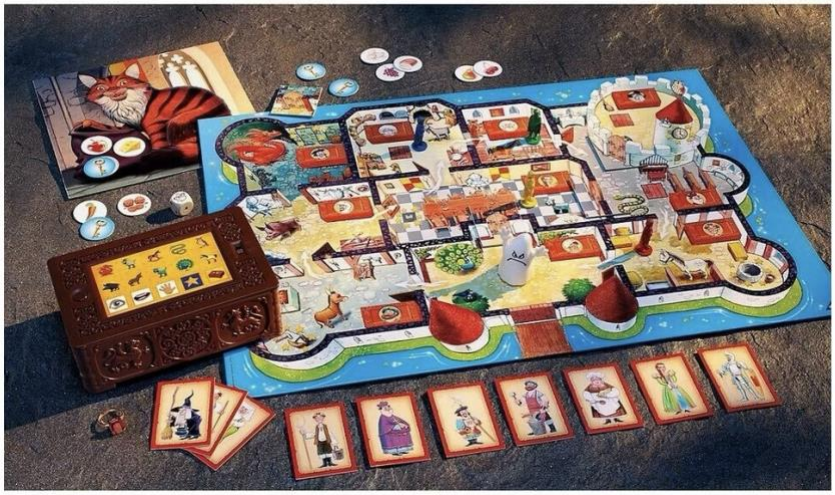

Figure 1 – Wer war's components[2]

4.1.2 Gameplay

The players all start in the nursery of the castle. A turn always consists of two parts. At first, each player rolls a custom dice that shows either a number or a ghost. If a ghost is rolled, the ghost figure moves one room clockwise. If a player is in that room, they must return to the nursery. The player may then reroll until a number appears to proceed with movement. The player may move freely through the castle, avoiding only the room occupied by the ghost. After reaching a room, the player interacts with the treasure chest, triggering an event. Each room allows players to choose one of the following actions:

[1] Source: https://www.brettspiele-magazin.de/wer-wars/, assessed on February 25, 2025
[2] Source: https://www.idealo.de/preisvergleich/OffersOfProduct/908430_-wer-war-s-21854-ravensburger.html, assessed on February 25, 2025

- Talk to the animal
- Feed the animal its favorite food
- Search the room for items
- Use a key to reveal a suspect

The animals give concrete hints about the thief's appearance after receiving their preferred food, which players must find first.

4.1.3 Game Mechanics and Design Elements

There are various elements that make the game an engaging and immersive experience.

Time pressure

The main challenge of the game is the time pressure. The players must find the thief before the sixth hour ends and the evil magician arrives. Winning requires strategic movement and collaboration through communication as a team. For instance, the time pressure only allows players to search rooms strategically to collect items and gather clues on time.

Unpredictability

Random events such as trapdoors, ghost movements, or the magician's approach provide additional excitement and unpredictability. Those unforeseen events add up with the time pressure, creating tension and making it not too easy to win.

Cognitive engagement

The game requires memory to remember the favorite food of each animal and given clues. It also includes reasoning to eliminate suspects and a strategy to prioritize movements and actions.

Cooperative Gameplay

Teamwork is a key part of the gameplay. Through creating a common enemy, players are motivated to team up and work together to fight the evil magician and protect the castle. Players need to communicate and form strategies in order to find the thief before the time runs out.

Interactive storytelling

The game is narrative-driven, supported by the talking treasure chest that creates sounds and different character voices. This creates an immersive experience and strong world-building.

Feedback and reward

The reward system in Wer war's? Functions around uncovering clues and solving the mystery. The treasure chest motivates players as they progress. Moreover, hidden keys that can be found are rewarding, and they help to get one step closer to the end goal.

4.1.4 Design and Quality

The game's visuals are appealing and durable. The materials are well-made, but the character figures could be made of wood instead of plastic, with more details. The rulebook is well structured and clear. The treasure chest functions reliably and integrates with the gameplay, adding to the storytelling.

4.1.5 Limitations

One disadvantage is that although the electronic box is innovative, it can become repetitive over time, which could affect the replayability of the game. Furthermore, the simplicity of the game, which is designed for younger players, may not hold the attention of older children or adults for long periods of time. The reliance on audio cues also means that the game may be disrupted in noisy environments (Schallert, 2008).

4.1.6 Summary

Once the analysis was complete, the results were summarized in the tables in Appendix 1 for fast interpretation. In summary, Wer war's? shows how cooperative mechanics and interactive storytelling can promote engagement in players. The game is also highly motivating through the added element of time pressure. Young players especially enjoy the detective theme, and adjustable difficulty levels ensure it remains engaging for older players too (Schallert, 2008). The game offers a mix of exploration, memorization, and strategy.

For the purpose of this research, elements such as storytelling, task-oriented progression, cooperative gameplay, and cognitive engagement offer valuable insights (Appendix 1) for designing an educational tabletop game that is both fun and motivating. Especially inspiring is the electronic treasure chest and the collection of the food that has to be memorized.

4.2 Monopoly

- **Publisher:** Hasbro (originally Parker Brothers)
- **Number of players:** 2-6
- **Recommended age:** 8+ years
- **Playing time:** 60-180 minutes

4.2.1 Game Description

Monopoly, initially published by Parker Brothers in 1935 and now owned by Hasbro, is a competitive board game. It is one of the most well-known board games worldwide. It is available in over 100 countries and translated into 37 languages. While it has many thematic variations, it consistently retains its core mechanics, including real estate trading, resource management, and economic strategy (Meßner & Hemmer, 2020).

The main objective of Monopoly is to bankrupt all opponents by buying properties, building houses and hotels on them, and collecting rent from players who land on those properties. To acquire properties, every player starts with a set amount of money using paper currency provided in the game. They must strategically use the money to buy or sell properties, trade with other players, and avoid bankruptcy.[3]

The game board represents a small city featuring streets, buildings, utilities, railroads, and community spaces, which creates a simplified economic system. Players navigate the board, rolling two dice to move and using board tokens. They interact with elements like “Chance” and “Community Chest” cards, pay taxes, and go to jail. They attempt to create monopolies to charge higher rents.

The components include 28 property cards, play money, 32 houses, 12 hotels, a set of Chance and Community Chest cards, tokens, dice, and a title deed deck (Jarvis, 2024).

[3] Source: https://products.hasbro.com/de-de/product/monopoly-board-game-for-ages-8-plus-for-2-6-players-includes-8-tokens-tokens-may-vary/C1009, assessed on February 25, 2025

Figure 2 - Monopoly game components[4]

4.2.2 Gameplay

Players start the game with a set amount of money and take turns in clockwise order. Each turn involves rolling the dice, moving around the board, and taking action, depending on the square on which they land. Actions can be as follows:

- Purchasing unowned properties
- Paying rent to other players
- Drawing a chance or community chest card
- Paying taxes or going to jail
- Trading properties with other players

A key gameplay element is building houses and hotels on owned property to increase the rent value. To build, a player must own all properties of a color group. Bankruptcy occurs when a player owes more money than he possesses, and the creditor absorbs the player's assets. The game continues until only one player is left with money.

[4] Source: https://products.hasbro.com/de-de/product/monopoly-board-game-for-ages-8-plus-for-2-6-players-includes-8-tokens-tokens-may-vary/C1009, assessed on February 25, 2025

4.2.3 Game Mechanics and Design Elements

Economic simulation

Monopoly is a simplified economic model that teaches players concepts such as investment, risk management, and opportunity cost. Players must decide how to deal with resources, when to save, and when to take a risk.

Player elimination

Monopoly works with the principle of player elimination. As the game progresses, bankrupt players are removed.

Competitive dynamics

Monopoly creates strong competitive interaction. The game encourages the loss of one player to be the gain of another, which creates additional tension and potential for conflict. This is particularly true in trading and resource management.

Cognitive engagement

Players need to plan, analyze probabilities, manage resources, and assess risks. Therefore, Monopoly promotes logical thinking and decision-making, even if some of these decisions are based on luck.

Trading and negotiation

Interaction between players includes trading and negotiations, allowing social dynamics and alliances to influence the course of the game. Through strategic action, a player who is on the verge of defeat can still become the winner and avoid bankruptcy.

Chance and unpredictability

Unpredictability is an essential element of the game, with luck-based outcomes ensuring a more balanced experience. Dice rolls determine movement, while Chance and Community cards bring rewards and penalties.

4.2.4 Design and Quality

The classic Monopoly board features a simple, iconic design that is easily recognizable. The visual design is clear, though the artwork is minimal compared to modern games. The game pieces (metal

tokens, plastic houses, and hotels) are durable and tactile. The physical currency adds an economic feel. The rule book is compact, although players commonly use their own house rules.

4.2.5 Limitations

Monopoly remains popular due to nostalgia, simplicity, and its strong branding. One point often criticized is the slow pace of the game, especially in later stages. It can become a never-ending game while the remaining players negotiate over resources and rule monopolies. Another point of criticism includes luck and excessive game length.

4.2.6 Summary

Once the analysis was complete, the results were summarized in the tables in Appendix 1 for fast interpretation. In summary, Monopoly is a classic example of a popular competitive board game. It incorporates engaging game mechanics that encourage player interaction.

For this research, Monopoly highlights the potential of economic simulations in educational game design. Based on its popularity, it is also a good example of how to identify game mechanics that players enjoy and keep engaged. The use of randomness, dynamic player interaction, and strategic asset development can inspire mechanics for educational board games.

4.3 Catan

- **Publisher:** Kosmos (Germany), Catan Studio (international)
- **Number of players:** 3-4 (expandable to 5-6)
- **Recommended age:** 10+ years
- **Playing time:** 60-120 minutes

4.3.1 Game Description

Catan (originally The Settlers of Catan) is a competitive strategic board game designed by Klaus Teuber, first published in Germany in 1995. The game tiles have become one of the most influential tiles in modern tabletop gaming, and Catan itself is known as a classic on the global market, featuring 40 different languages. The game is modular, with lots of additions and extensions. It marked a shift towards resource management, trading, and indirect competition

games. Moreover, Catan has received numerous awards, including the German “Spiel des Jahres” (Game of the Year) award in 1995, and has sold more than 40 million copies worldwide.

The aim of the game consists of being the first player to score 10 victory points which are earned by constructing cities, roads, and settlements on the island of Catan. Victory points are earned through building structures, possessing the longest road or largest army, and achieving specific development goals.

Figure 3 - Catan game components[5]

The board is modular and consists of hexagonal terrain tiles that represent different resource areas (wood, brick, grain, ore, and sheep). At the beginning of the game, the tiles are randomly arranged, creating a new island layout each time. Each terrain tile is assigned a number token (2–12), which determines when resources are produced based on dice rolls. Players collect and trade resources, build infrastructure, and expand their territory, creating a dynamic game with interaction and competition.[6]

4.3.2 Gameplay

The game begins with all players placing two settlements and two roads on the board. A turn consists of three steps:

[5] Source: https://www.placegames.com.br/catanojogo, assessed on March 2, 2025
[6] Source: https://www.catan.de/, assessed on March 2, 2025

- **Roll the dice:** Two dice are rolled by the player to determine which hexagon produces resources for all players with settlements or cities. A roll of 7 activates the robber, which blocks production on a tile and allows the active player to steal a card from another player.
- **Collect and trade:** Players may trade resources with each other or via ports at fixed exchange rates.
- **Build:** Players spend collected resources to construct roads, settlements, or cities, and they can also acquire development cards.

Development cards offer a variety of effects, including extra victory points, knights (used to gain the Largest Army), and special abilities. A player wins the game by being the first to earn 10 victory points.

4.3.3 Game Mechanics and Design Elements

Resource management

Catan works with the principle of resource management, in which access to resources is determined by luck and player choice. The players must balance those resources, keeping short-term needs and long-term goals in mind.

Trading and player interaction

A key mechanic in Catan is trading, where players negotiate deals that benefit themselves while limiting the progress of others. Players must communicate and navigate direct conflict.

Randomness and strategy

Catan introduces randomness to the game through the dice roll, although further success depends on initial placements and the ability to plan and adapt.

Cognitive engagement

The game promotes strategic thinking, planning, and decision-making skills. Players are engaged in resource calculation and probability assessment. Efficient planning is necessary to achieve long-term goals such as city improvements or strategies for development cards.

Variable setup

The modular design of the board makes sure that no game is the same. The hexagonal tiles and token numbers are always placed randomly, which will ensure that games are never identical. Based on the tile layout, replayability, and adaptable strategies are created in each game.

Area control

Players compete for territory by building settlements and roads. Due to limited space, strategic placement and expansion are essential. Moreover, blocking opponents' expansion can become a powerful tactic.

Robber Mechanic

The robber mechanic is activated when a seven is rolled and adds tactical control and balance to the game. Players with more than seven cards must discard half of them, and the active player places the robber to block a tile and steal a resource.

4.3.4 Design and Quality

Catan is made of high-quality components, with colored hex tiles, wooden and plastic pieces, and a clean visual layout. The visuals are functional and help players easily differentiate between the resource types. The scales are reasonable, and there are options for expansion. The rulebook is clearly structured and accessible for new players.

4.3.5 Limitations

While Catan made its way up to a very popular game, criticism included occasional player isolation or resource shortages. In those cases, unlucky rolls or poor placement can reduce player engagement. Nevertheless, Catan remains one of the most accessible and rewarding strategy games on the market.

4.3.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. In summary, Catan is a popular game that balances strategy, randomness, and social interaction. Its modular design creates flexibility and new game experiences each time.[7]

[7] Source: https://www.catan.de/, assessed on March 2, 2025

For the purpose of this research, elements such as modularity, resource management, and cognitive engagement offer valuable insights (Appendix 1) for designing an educational tabletop game that requires planning and strategic thinking and has high replayability. Especially interesting are mechanics such as trading and resource management.

4.4 Santorini

- **Publisher:** Roxley Games
- **Number of players:** 2-4 players
- **Recommended age:** 8+ years
- **Playing time:** 20-30 minutes

4.4.1 Game Description

Santorini is a competitive abstract strategy board game originally designed by Gordon Hamilton in 1985 and later recreated by Roxley Games in 2016.

The game is about helping the island's citizens build a village in the middle of the sea. Set on a 5x5 grid representing the Greek island of Santorini, players control builders who move and construct layered buildings. The goal is to be the first to move one of your builders to the third level of a building.

Figure 4 - Santorini game components[8]

[8] Source: https://roxley.com/products/santorini?, assessed on March 3, 2025

The game components include a plastic base grid, 18 domes, 22 level-two pieces, 18 level-three pieces, 30 level-one building blocks, and different colored builder miniatures.

Santorini differentiates itself from other abstract games by its integration of asymmetric player powers through the use of god cards. These abilities can create different experiences for each player, enabling a range of strategic approaches.[9]

4.4.2 Gameplay

The game begins with all players placing two construction worker figures anywhere on the empty game board. A turn consists of two steps in the following order:

- **Move** one of the player's builders to a neighboring square (vertically or diagonally).
- **Build** a level of the building in a neighboring space to the moved builder.

Buildings are built on up to three levels and then capped with a dome to prevent access. A player wins immediately by successfully moving a builder onto a third-level building. If a player cannot move or build on their turn, they lose the game. Moreover, in the variant mode, each player receives a god card. This card grants a unique ability, such as building twice or moving opponents. These abilities change the strategic decisions players make and increase the complexity of the game.

4.4.3 Game Mechanics and Design Elements

Abstract spatial strategy

Santorini is a strategy game focused on spatial movement and area control. With every move, players must consider positioning and blocking and anticipate the potential consequences of their actions.

Asymmetry

The god powers give the game a dynamic asymmetry. Each card offers different powers in different areas, such as restricting opponents, increasing the mobility of others, or enabling unconventional moves.

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[9] Source: https://boardgamegeek.com/boardgame/194655/santorini, assessed on March 3, 2025

Perfect information

The game is a rare case of perfect information where players have access to all the information about the board and moves. There is no randomness involved during the game.

4.4.4 Design and Quality

The game components are of good quality, tactile, and aesthetic. The cards are clearly illustrated and explained, and the rule book is well organized. The visual design is beautiful, inspired by the actual Greek island with a blue and white color scheme.

4.4.5 Limitations

One disadvantage of Santorini is that it can seem a bit abstract and repetitive after several rounds, especially if you keep using the same god powers. Some god abilities are also significantly stronger than others, which can lead to unbalanced matches. And although it's great for two players, it doesn't scale well to more players.[10]

4.4.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. In summary, Santorini emphasizes how abstract strategy can be used and transformed into an immersive and dynamic experience.

For the purposes of this research, Santorini gives some valuable insights for designing a tabletop game that is simple to learn and still promotes strategic thinking and a certain complexity. The role of asymmetry is an interesting approach to creating different angles and experiences in each game.

4.5 Dixit

- **Publisher:** Libellud / Asmodee
- **Number of players:** 2-6 (up to 12 with extension)
- **Recommended age:** 8+ years

[10] Source: https://roxley.com/products/santorini?, assessed on March 3, 2025

- **Playing time:** 30 minutes

4.5.1 Game Description

Dixit is a storytelling game created by Jean-Louis Roubira in 2008. It won the "Spiel des Jahres" (game of the year) award in 2010 and has since gained popularity. The game revolves around creativity and interpretation, offering an alternative to strategy-driven board games (2024).[11]

During the game, the storyteller chooses one of their cards from the deck and thinks of a caption for it. The caption can be a word, phrase, or sentence, and should relate to the image, but it shouldn't be too obvious. The aim of the game is to guess the storyteller's card and score points by selecting your own cards that match the caption. Based on the points earned, each player moves their token on the game board. The first player to reach 30 points (the finish line on the board) wins. In case the deck is empty, the player with the most points is the winner.[12]

The game consists of 84 large, surreal, illustrated cards, 36 voting tokens numbered from 1 to 6 in six different colors, six wooden rabbits, and a game board (scoring track) inside the box.

Figure 5 – Dixit game components[13]

[11] Source: https://www.spiel-des-jahres.de/spiele/dixit/, assessed on March 5, 2025
[12] Source: https://boardgamegeek.com/boardgame/39856/dixit, assessed on March 5, 2025
[13] Source: https://www.zambomba.de/shop/libellud-dixit-spiel-des-jahres-2010/, assessed on March 5, 2025

The game promotes creativity, abstract thinking, and emotional intelligence. It is suitable for a wide range of ages and people.[14]

4.5.2 Gameplay

Each player begins with a hand of six cards. The storyteller starts by selecting one card from their hand and saying a caption inspired by the image. The other players each choose one card that they feel could match the caption and submit it. Afterward, the storyteller shuffles the cards and reveals them face up. Now, the players, excluding the storyteller, vote secretly on which card they think is the storyteller's. The points are awarded as follows:

- If all or no player guesses correctly, the storyteller gets zero points, and all other players get two.
- If at least one player guesses correctly, but not all, the storyteller and the correct guessers get three points.
- Players gain one point for each vote their own card receives.

Afterward, the players move their game tokens on the board according to the number of points they received and refill their hand cards with six cards again. The role of the storyteller passes clockwise. The game ends when all cards are used or one player reaches 30 points.

4.5.3 Game Mechanics and Design Elements

Creativity

The key element of Dixit is using creativity to come up with captions. The captions must be descriptive but vague. The storyteller scores best when some but not all players guess correctly. Moreover, the cards are surreal and open-ended, illustrated, which leaves a lot of room for interpretation. The game lives from metaphors and indirect communication. This leads to some tension during the game, curiosity, and also funny misunderstandings or different interpretations.

Players must try to understand the storyteller's thought process while also trying to mislead others with their own cards. The result is a social guessing game based on associations and empathy.

Scoring system

[14] Source: https://www.ultraboardgames.com/dixit/game-rules.php, assessed on March 5, 2025

The scoring system rewards players who can communicate on the edge of understanding while discouraging rather obvious or cryptic clues.

Replayability

Due to the broad variations of cards, the games can be different, and depending on the players, the outcome is always different. There are expansion sets with new art styles and themes for players who play more frequently.

4.5.4 Design and Quality

Dixit's visual design stands out with its oversized cards, which feature detailed illustrations by various artists. The game feels like an art experience and creates the right environment for creativity. The game components are also colorful and of high quality. The game instructions are easy to understand, allowing players to quickly get started.

Figure 6 - Dixit illustrated cards[15]

4.5.5 Limitations

Some of the game's weaknesses lie in its playability with the same set of cards. Frequent players will eventually know all the cards, which can give them an advantage. However, Dixit has solved this problem by releasing many different versions and card sets, which even offer different art styles, keeping the gaming experience fresh.[16]

[15] Source: https://oficinadidactica.pt/produto/jogo-dixit/, assessed on March 5, 2025
[16] Source: https://www.zambomba.de/shop/libellud-dixit-spiel-des-jahres-2010/, assessed on March 5, 2025

4.5.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. To summarize, Dixit offers an engaging and creative game experience. It stands out due to its design and as an example of abstract storytelling.

For the purpose of this research, Dixit highlights the power of storytelling and the use of visual design in tabletop games. The game is an interesting example of a possible educational game that promotes creative thinking and cognitive engagement.

4.6 Carcassonne

- **Publisher:** Hans im Glück / Z-Man Games
- **Number of players:** 2-5 (up to 6+ with expansions)
- **Recommended age:** 7+ years
- **Playing time:** 30-45 minutes

4.6.1 Game Description

Carcassonne is a board game designed by Klaus-Jürgen Wrede in 2000, inspired by the medieval fortress of the same name in southern France. In 2001, the game won the "Spiel des Jahres" (Game of the Year) award. Carcassonne lets players construct a landscape by strategically placing tiles to build cities, roads, monasteries, and fields.

The board consists of square tiles featuring different combinations of terrain elements. The components include 72 terrain tiles with roads, cities, fields, and monasteries, 40 wooden follower pieces (meeples) in five colors, and a scoring track board. Instead of a static board, the game begins with a single starting tile and expands dynamically as players add tiles to create the landscape.

Figure 7 - Carcassonne tiles and meeples[17]

The game promotes spatial reasoning, strategic planning, and indirect competition through the control of territories. Players must score points by placing followers on completed features. The objective of the game is to make the most strategic placements of tiles and followers (2025).[18]

4.6.2 Gameplay

Each player begins with a supply of meeples, and the game starts with a single tile. Each turn consists of the following steps:

- **Draw a tile** from the stack.
- **Place the tile** next to any existing tile, making sure the landscape fits together (for instance, roads should connect to roads).
- **Optionally place a follower** on the played tile, choosing a feature (road, city, field, or monastery)

Points are scored when features are completed. Roads give one point per tile when the road is closed at both ends. Enclosed cities give two points per tile and a bonus for shields (1 point per tile if incomplete at the end). Monasteries give nine points when they are surrounded by nine tiles, and farms are only scored at the end and earn three points per completed city. After scoring, the meeples are returned to the player. The game continues until all available tiles have been placed. All incomplete elements are scored at the end, and the player who scored the highest is the winner.

[17] Source: https://www.idealo.de/preisvergleich/OffersOfProduct/201731003_-carcassonne-big-box-3-0-2021-hans-im-glueck.html, assessed on March 5, 2025
[18] Source: https://www.zmangames.com/game/carcassonne/, assessed on March 5, 2025

4.6.3 Game Mechanics and Design Elements

Follower (Meeple) placement

A core strategic element of the game is the placement of the followers, since each player has a limited number of followers. Followers can only be accessed once the feature has been completed. Therefore, players must think ahead and balance short-term scoring opportunities with long-term investments.

Modular board

Based on players' choices, the game board grows, which creates a constantly changing landscape. Each tile placement can shift the game, enabling new scoring opportunities or blocking existing ones.

Indirect competition

Although there is no direct conflict, players have to compete through tile placement and shared features. Players can merge their features, resulting in scoring contests, creating tension, and adding tactical decision-making to the game.

Scoring system

The scoring system leaves the players to figure out their own strategy and leaves room for different approaches to score the most points at the end. Incomplete features at the end still score points, which keeps players motivated even when long-term goals aren't completely achieved.

4.6.4 Design and Quality

The game’s components are of high quality. The tiles are durable, with medieval-themed illustrations. The wooden meeples have become a symbol of the game and are both functional and aesthetic. The rulebook is clear and includes illustrations for faster learning. Various expansions include new mechanics, making the game replayable and adaptable to new and more complex strategies.

4.6.5 Limitations

One disadvantage of Carcassonne is the limited interaction between players, as they mainly focus on their own tiles. There is also a large element of luck in an otherwise strategic game. It can

happen that one player builds strategically well but never draws the tile they need, while someone else randomly gets the perfect piece and scores lots of points.[19]

4.6.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. To summarize, Carcassonne demonstrates how strategic resource management and planning can be used in an accessible board game.

For this research, Carcassonne highlights how limited player resources can encourage critical decision making and how multiple possible strategies can create more meaningful choices. Moreover, the game's modularity creates high replayability and more engagement in the game.

4.7 Scrabble

- **Publisher:** Hasbro (U.S. and Canada), Mattel (rest of the world)
- **Number of players:** 2-4
- **Recommended age:** 10+ years
- **Playing time:** 60-90 minutes

4.7.1 Game Description

Scrabble is a classic competitive word game created by Alfred Butts in 1938. It has become one of the most iconic and successful educational board games worldwide. The game combines vocabulary knowledge with strategic thinking.

During the game, players must form words using randomly drawn letters on a 15x15 game board. Each letter has a value based on its frequency in English, and words placed on premium squares can increase the values. The goal of Scrabble is to score the most points by constructing words and using the board effectively.

[19] Source: https://www.zmangames.com/game/carcassonne/, assessed on March 5, 2025

The game includes 100 letter tiles (including two blank cards), four tile racks, and a draw bag. The board features special scoring spaces, such as double/triple letter and double/triple word squares that reward strategic positioning (Raikar & Pai, 2025).

Figure 8 - Scrabble game board[20]

Scrabble is widely used in educational settings due to its linguistic nature. It helps build vocabulary, spelling, and pattern recognition. Moreover, competitive Scrabble includes dictionaries and word lists to have a standard of acceptable words.

4.7.2 Gameplay

Each player draws seven letters and places them on their rack. A turn consists of the following steps:

- **Play a word:** A word can be played by placing the letter tiles on the board in a straight line (horizontal or vertical). The formed word has to connect to at least one existing word on the board.
- **Score:** The points scored are added by adding the value of each tile, plus any bonuses from premium squares.
- **Draw new tiles:** the rack must be refilled to seven letters.

[20] Source: https://www.manufactum.at/scrabble-jubilaeumsausgabe-a32024/, assessed on March 13, 2025

Players also have the possibility to pass or exchange some or all of their word tiles. The game ends when all tiles have been drawn and one player uses up all their tiles left, or when all players pass two turns in a row. The player with the highest score wins.

4.7.3 Game Mechanics and Design Elements

Word formation

The primary mechanic revolves around language. Players must form valid English words using the available letters in their possession.

Strategy and tile management

Players have to decide when to play their letter tiles and when to hold on to them for long-term higher opportunities. Moreover, the placement on the board is important to score as many points as possible. The key is to maximize the bonus of certain placements and limit opponents' opportunities to score high points.

Randomness and adaptability

Letters are distributed randomly, which adds the element of chance to the game. A player with strong adaptability can still strongly influence the outcome. As a result, the letter drawing affects the gameplay but doesn’t dominate it.

Cognitive engagement

The game demands multiple cognitive skills, such as linguistic (spelling and vocabulary), logical (pattern formation, word recognition), mathematical (scoring calculation), and strategic (blocking and resource management) skills.

4.7.4 Design and Quality

Scrabbles' visual design is functional, minimalistic, and clear. The letter tiles are easy to handle and durable, often made from wood or plastic. The board's grid is easy to understand, and the color-coded premium spaces help with quick identification. The rulebook is standardized globally and clear.

4.7.5 Limitations

One disadvantage of Scrabble is that it strongly favors players with an extensive vocabulary, which increases the learning curve for casual players. Luck also plays a role since bad tiles can limit a

player's options, no matter how good they are. In addition, the game can become long if players take too much time to think, which slows down the flow of the game (Raikar & Pai, 2025).

4.7.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. To summarize, Scrabble is a benchmark in word-based educational games, with high simplicity and replayability while intellectually challenging.

Regarding this research, key takeaways include the effective integration of educational content into gameplay, the use of competitive scoring, and visible progress.

4.8 Pictionary

- **Publisher:** Mattel
- **Number of players:** 4+ (teams of 2 or more)
- **Recommended age:** 8+ years
- **Playing time:** 30-60 minutes

4.8.1 Game Description

Pictionary is a party drawing game created by Robert Angel in 1985. It has become a widely recognized classic game with family and friends or groups. The game is ideal for social gatherings, focusing on creativity, speed, and teamwork.

The core of the game involves players drawing a visual representation of a word or phrase while teammates try to guess the word on a strict time limit. No letters, numbers, or verbal clues are allowed, which challenges players to communicate ideas through imagery alone. The aim of the game is to score more points than the other teams and reach the end goal on the board first.

The standard game includes a game board, category cards, a one-minute sand timer, a die, drawing pads, player tokens, and pencils. The categories typically consist of objects, actions, places, and

difficult words. Modern digital and kids' editions offer variations while keeping the drawing mechanic (2025).[21]

Figure 9 - Pictionary game components6[22]

4.8.2 Gameplay

Players must form two or more teams at the start of the game. In each round, one player from a team selects a card from a category. Then, the player has one minute to draw the word (or phrase) while the player's teammates attempt to guess it. The rules include that no letters, numbers, or verbal communication are allowed. Correct guesses within the time limit allow the team to roll the dice and move their token forward on the board. The first team to reach the end of the gameboard wins. Special squares and challenge categories may involve simultaneous drawing and guessing by all teams.

4.8.3 Game Mechanics and Design Elements

Visual communication

The game consists of non-verbal communication. Players must think abstractly and translate words or phrases into simple drawings, shapes, or symbols.

Team-based play

21 Source: https://www.wikihow.com/Play-Pictionary, assessed on March 13, 2025
22 Source: https://www.amazon.ca/Mattel-GAMES-DKD50-Pictionary-Game/dp/B017B76GHA, assessed on March 13, 2025

Pictionary is based on cooperative play but also challenges through the competition between teams. That adds stronger team play and competitive tension. Success depends on the connection between the drawer and the group, their dynamic, and shared understanding.

Time pressure

The timer adds time pressure, forcing players to make fast decisions. It also adds visual pressure to the players' guessing because they see the sand running out.

Cognitive engagement

The game engages cognitive skills, such as creativity and imagination, problem-solving, pattern recognition, and memory and association. Players have to interpret limited information, guess words from abstract visualization, and recall shapes, symbols, and previous drawings, while the drawer has to abstract the information in a visually clear way for the specific teammates.

Accessibility and entertainment

The accessibility is high due to the low entry level of the game. There are no artistic skills required, just a group that wants to have an entertaining time. This results in reduced performance pressure and increased inclusivity for players of all ages.

4.8.4 Design and Quality

Pictionary uses simple and functional materials. Paper and pencil pads are easily replaced, and the board has clear color coding for easy navigation. The sand timer and word cards are durable, and the rulebook is short and easy to understand. Modern versions use whiteboards, erasable markers, or digital apps, making the game accessible at all times. Versions use whiteboards, erasable markers, or digital apps, making them accessible at all times.

4.8.5 Limitations

Pictionary can be a lot of fun, but it also has its weaknesses. Players who are unsure of their drawing skills may feel excluded or frustrated, and some words are much more difficult than others, which can sometimes make the game seem unbalanced. In addition, games can quickly become one-sided if the teams are not evenly matched (2025).[23]

[23] Source: https://www.wikihow.com/Play-Pictionary, assessed on March 13, 2025.

4.8.6 Summary

Once the analysis was completed, the results were summarized in the tables in Appendix 1 for fast interpretation. To summarize, Pictionary shows how simple tools and mechanics can create highly entertaining, engaging, and socially interactive experiences. The game is valuable for both entertaining and educational purposes, as well as promoting team building.

Regarding this research, Pictionary provides insights into nonverbal communication, time-based motivations, and task-oriented progression. Key takeaways include encouraging teamwork through collaborative problem-solving under pressure and creating tools that emphasize creativity over accuracy, while still providing a valuable learning experience.

Chapter V – Spell: Tabletop Game Design Project

During this dissertation, the game *Spell* was developed based on research through design and playtesting. The following section provides a detailed description and explanation of the game.

5.1 Game Presentation and Description

Spell is a cooperative, language-based board game for 2 to 4 players. The game combines storytelling, luck, and strategic thinking, promoting cooperation and educational challenges. In a magical forest threatened by a shadow beast, players must work together to rescue creatures, collect pieces of a magical diamond, and return them to the center of the board before the spreading shadow beast overtakes the forest.

5.1.1 Game Overview

Number of players: 2-4

Recommended Age: 6+

Type: Cooperative

Goal: Help cursed creatures, collect the four diamond pieces, and return them to the center of the board before the Shadow consumes the forest.

Storytelling

In a quiet, magical forest, there was a bright and powerful diamond. It kept the forest full of light, life, and magic. But one day, a dark creature called the Shadow Beast appeared. It broke the diamond into four pieces and spread shadows all over the forest. The forest grew cold and dark. The forest creatures tried to bring the pieces back, but the Shadow Beast cursed them, and now they're stuck. They need your help! You and your friends are magicians. Use your magic words to break the curse, help the creatures, and collect the diamond pieces. Bring all four pieces back to the center of the board to restore the light and save the forest—before the Shadow takes over completely!

Components:

- **Gameboard** (6x6 grid divided into four quadrants)

- **Tiles** (4 creature tiles, 12 trap tiles, 10 event tiles, 4 center tiles, 6 blank tiles, 36 shadow tiles)
- **Tokens** (4 Player tokens, 4 diamond piece tokens, fire tokens)
- **Cards** (Word cards, creature cards, shadow challenge cards, event cards)
- **Dice** (1 green die and 1 orange die)
- **Spell book** (to track casted spells)

A table listing the contents of all cards can be found in Appendix 3-6.

5.1.2 Ruleset

Setup of the gameboard

To prepare the game, each quadrant of the game board must be filled with a stack of cards. To assemble the stacks, divide the creature tiles and treasure chest tiles into four stacks, and distribute the remaining tiles evenly and randomly among the individual stacks. Then, all the stacks are shuffled and the cards are placed face down in each quadrant, one stack per quadrant. The player tokens are placed in each of the four corners of the game board. Finally, the cards are shuffled and sorted into their respective stacks, while all player tokens are placed within reach.

Turn structure

Each turn in the game consists of two phases. In the first phase, the active player must move their token one or two steps on the game board. However, the movement is restricted in certain ways: A player may not move over a shadow tile, but they may move onto it in order to remove it. Alternatively, the player may move onto a hidden tile, which must be revealed immediately.

In the second phase, the player resolves the effect of the space they landed on. Depending on the type of tile revealed, the following outcomes are possible:

- **Creature tile**: Draw a Creature Card (If you know the right spell, cast it, free the creature, and collect one diamond piece).
- **Shadow tile**: Attempt a Shadow Challenge.
- **Trap**: Shadow Beast (Place 1 extra Shadow Tile), Sticky Vines (Skip your next turn), Magical maze (Return to the start), Sealed Gate (Return to the tile you were on before).

- **Event:** Draw and resolve an Event Card.
- **Empty tile**: Nothing happens

At the end of each round, the players place a shadow tile. To determine where a shadow tile lands, players roll two dice (green and orange). The numbers and colors act like coordinates, and the tile can be placed based on the dice roll.

The players win when all creatures have been found and helped with a spell, and the players have collected all diamond pieces and restored the heart of the forest. They lose the game if all four center pieces are covered by shadow tiles or all the tiles are covered. In that case, all the players lose together against the game (the shadow beast).

Removing Shadows

To remove a shadow tile from the board, the player must step onto one and draw and complete a shadow challenge card. Tasks may include rhyming, finding synonyms, or building words. Some special cards let players remove more than one shadow at once.

Spells & Words

Spells are made from 3 words: e.g., “break the ice”. The word cards are stored in a shared pool. Players must use the right combination to help creatures and win diamond pieces.

Fire Tokens

Fire tokens let you peek under one tile before your turn. They can only be used once and are gained through Event Cards.

5.2.2 Rule adjustment

To adapt to different age groups, skill levels, and language abilities, the rules of Spell can be adjusted without affecting the basic gameplay experience. The game is designed to be versatile, allowing players to customize components and difficulty levels to suit their preferences, as in the following examples.

Adjusting the number of trap and event cards: Removing some trap cards can make the game easier and more suitable for younger or less experienced players, while adding more traps increases the difficulty level for older or more advanced players.

Customizing word sets: Different packs with varying difficulty levels and vocabulary can be used to better match the language skills and learning goals of the players. The words can also feature certain themes of vocabulary.

Replacing cards and challenge cards: Creature cards and shadow challenge cards can be exchanged for versions customized to different age groups, themes, or difficulty levels.

Language customization: Although the main language of the game is English, the creature cards contain German translations by default, because I created it as a German game. These translations can be replaced with any other language, and the word cards and creature requirements can be customized according to the players' native languages and language learning goals to support the learning of other languages.

5.2 Mechanics

This section aims to provide a detailed explanation of the game mechanics and the reasoning behind them.

Cooperative gameplay

Instead of competing with each other, the players must cooperate and play together against the game. This approach builds on the previously discussed case study of the game *Wer war's?*, where players collaborate as well. Moreover, as discussed in the theoretical framework, drawing on Vygotsky's (1978) theory of the zone of proximal development and Paatsch et al. (2023), cooperative play facilitates learning and engagement by enabling learners to benefit from social interactions.

Modular game tiles

The game utilizes tiles, allowing for adaptability by making it easy to replace them. This makes the game more modular and accessible to a broader range of players. This system draws from the case studies of Catan and Carcassonne, which also utilize modular tiles to create dynamic gameplay that varies each time it is played, therefore supporting replayability. Additionally, the possibility of switching out language sets or vocabulary cards, similar to how Dixit offers different card decks, further promotes variation and replayability.

Hidden information (face down tiles)

The tiles are placed upside down, so players cannot see what is beneath. They have to uncover them and find creatures, but could also step on traps. This element introduces uncertainty and tension to the gameplay. Players make decisions under uncertainty, for instance, exploring unknown areas or encountering hidden enemies, as previously discussed in Tadelis (2013), who states that decision-making under uncertainty is a key component of game theory.

Word-based spells

Players must combine three word cards to cast spells and fulfill the creature's requests. These cards include a verb, a connector, and a noun (e.g., break the ice). The spells always keep the same structure to keep it simple, but still allow room for creativity and variation. Alternatives like "melt the ice" or "summon the sun" would also be valid spells. This mechanic draws on Chomsky's

(2003) earlier discussed theory of language as an innate ability, suggesting that children naturally possess the grammatical principles needed to learn any language. This enables them to manipulate sentence structures intuitively. Inspired by Scrabble, this mechanic promotes vocabulary building and word recognition. Once a spell is created, the spell words are placed in the spell book, which is organized into defined areas to make the structure intuitive.

Language challenge (Shadow challenge)

Players who want to remove a shadow have to draw a shadow card and complete a small language-based challenge. The challenge can contain rhyming, compound words, synonyms, or scrambled letters, from which the players must form a word. This encourages players to engage cognitively and enhances their problem-solving skills. As previously discussed in the theoretical framework, children are more likely to experience deeper learning when engaged in those play-based challenges, as Kirschner and Hendrick (2020) argue that learners absorb what they focus their attention on.

Shadow placement and time pressure

The players play against the growing shadow. Each round, a shadow tile is placed based on a dice roll. The shadow placement adds uncertainty and tension. This element is inspired by the game's *Wer war's?* approaching evil magician, which adds decision pressure and urgency to the game. It draws on the previously discussed theory of loss aversion from Engelstein (2020), who stated that loss aversion increases player investment. The spreading shadow mechanic encourages risk assessment and teamwork. It also aligns with Tadelis (2013) on strategic interaction under uncertainty.

Fire tokens

Players can earn fire tokens through events. Those let players peek under a tile before moving. The mechanic provides players with access to hidden information, enabling them to make more informed decisions. This aligns with Tadelis' (2013) game theory principles of strategic navigation of uncertainty.

Collecting diamonds and end goal

The four diamond pieces have to be collected to win the game. This common mechanic is inspired by the game *Wer war's?,* where players need to gather keys to open treasure chests and retrieve a

stolen ring. This gives the game a clear and manageable goal, rather than an overwhelming one. As Breault (2020) emphasizes in narrative design, a game goal should be smaller and relatable rather than something as big as “saving the world.” In this case, the mission to restore the magic by finding the diamond pieces aligns with that principle.

Storytelling

The story creates an exciting environment and makes the children more engaged in the game. The elements of a missing diamond, a shadow monster that is approaching, and creatures in need of help allow children, as previously discussed in the theoretical framework, to play an active part in the story and its outcome. This supports Breault's (2020) theory that narrative design promotes player immersion in the game. Moreover, the story-driven environment encourages imaginative engagement and social collaboration, aligning with Vygotsky’s (1978) theory that play supports development.

5.4 Visual Language

The visual design of the game *Spell* is intentionally minimal and clear to avoid overwhelming players, while using colorful and playful imagery to maintain a sense of fun and engagement. The decision to use imagery draws on Clark's & Paivio's (1991) Dual Coding Theory, which emphasizes that learning is more effective when information is presented through both verbal and visual channels. In the game, the visuals on tiles and cards complement the written words with simple, recognizable illustrations. This design not only supports understanding but also encourages deeper processing, as described by Craik and Lockhart's (1972) Levels of Processing model, which links deeper cognitive engagement to better memory retention.

The chosen font, *Menco*, was selected for its readability and its playful appearance, making it well-suited for a young audience. The following section provides a more detailed description of specific design elements.

Tiles

The tiles are the largest visual part of the game and need to fit together in all possible combinations, whether placed face-up or face-down on the game board. The tiles are grouped into different categories, each distinguished by a specific color and alignment. For example, trap tiles feature an image aligned to the left side, with the title and instructions on the right (see figure 16 in products). The back of the tile displays a leaf pattern representing the forest, a commonly used design choice in other games to indicate the tile's reverse side. Additionally, each tile has a light border to visually separate it from the background and neighboring tiles.

Creatures

The creatures are the stars of the game and are featured on the most vibrant tiles. The lighter color of the creature stands out on the vibrant, darker background. The creatures fill the tiles, appearing larger and more engaging.

Creature cards share a cohesive design that matches the corresponding creatures, using the same color scheme and distinctive eyes to clearly indicate their connection to the tiles.

The cards' other side features two speech bubbles, designed to be easily recognizable and to present information in a clear and readable way.

Shadow beast

The shadow beast is the enemy of the game, threatening to take over the forest. Its design is dark and mysterious, but not too scary for children.

The shadow cards, used to resolve challenges, share the same color scheme, clearly linking them to the shadow beast. Each card features a simple task with the most important word highlighted for quick recognition.

Events

Event tiles needed to be more abstract, since events are not tied to a specific visual image. They are illustrated with magical sparks, fitting into the magical theme. The event cards share the color scheme and imagery for quick recognition. Each card presents an event with either a positive or negative outcome, determined by a die roll. Due to the narrative content and nature of the cards, they include more text than others. To support readability, especially for young players, the card layout is carefully structured. Each card includes an image related to the event to engage the brain's nonverbal system, a bold title for quick recognition, and a short narrative line to keep the player engaged in the story. The instructions follow in a secondary layer, still clearly readable, but a bit smaller than the story. This structure allows children to quickly scan, recognize, and understand the effect of cards after just a few repetitions.

Game board

The game board is designed in a simple and clean way to avoid distracting from the main elements of the game: the tiles. Since the tiles are quite colorful, with each category displaying a different color, the board itself remains more neutral to avoid overstimulation. It features a magical forest, as the story indicates.

The game board is also symmetrical, to support the coordinate system used for shadow placement, and is visually divided into four quadrants to simplify the setup (dividing the tiles into each quadrant). The diamond in the middle of the board is covered by the shadow and has the same color to emphasize that the magical heart must be restored. The coordinates around the board use two colors, matching the colors of the dice. The information is small but readable, not distracting from the game, but structured enough to guide the shadow tile placement.

5.5 Products

The following images showcase the final version of the developed game.[24]

Figure 10 - Spell packaging

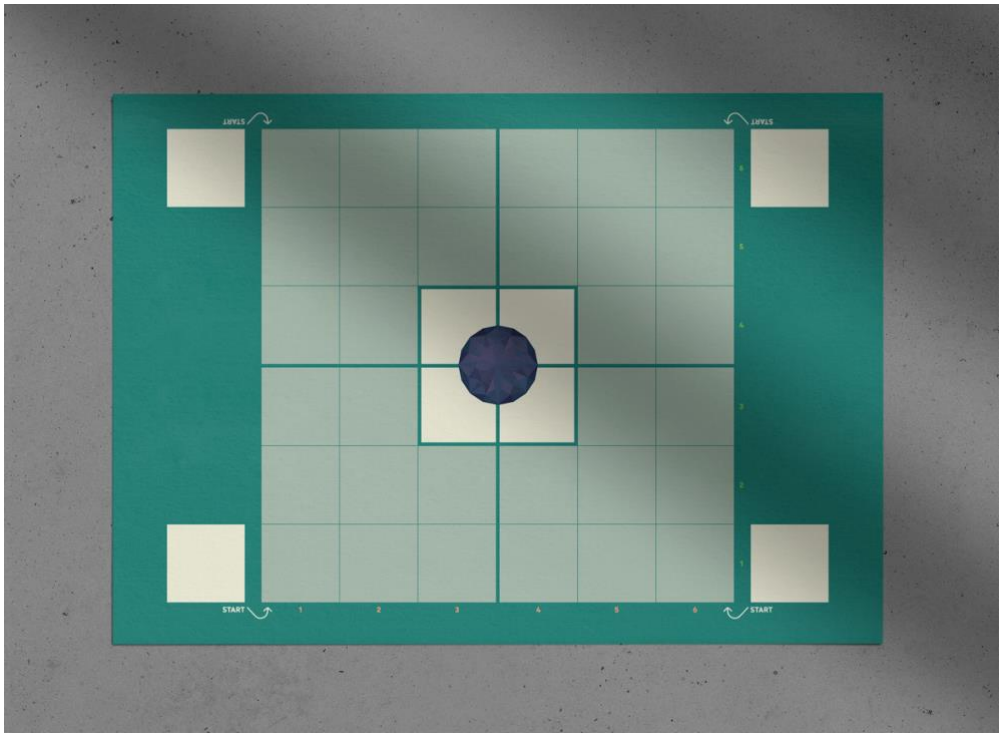

Figure 11 - Empty game board

[24] All mockups were created with Adobe Stock mockups

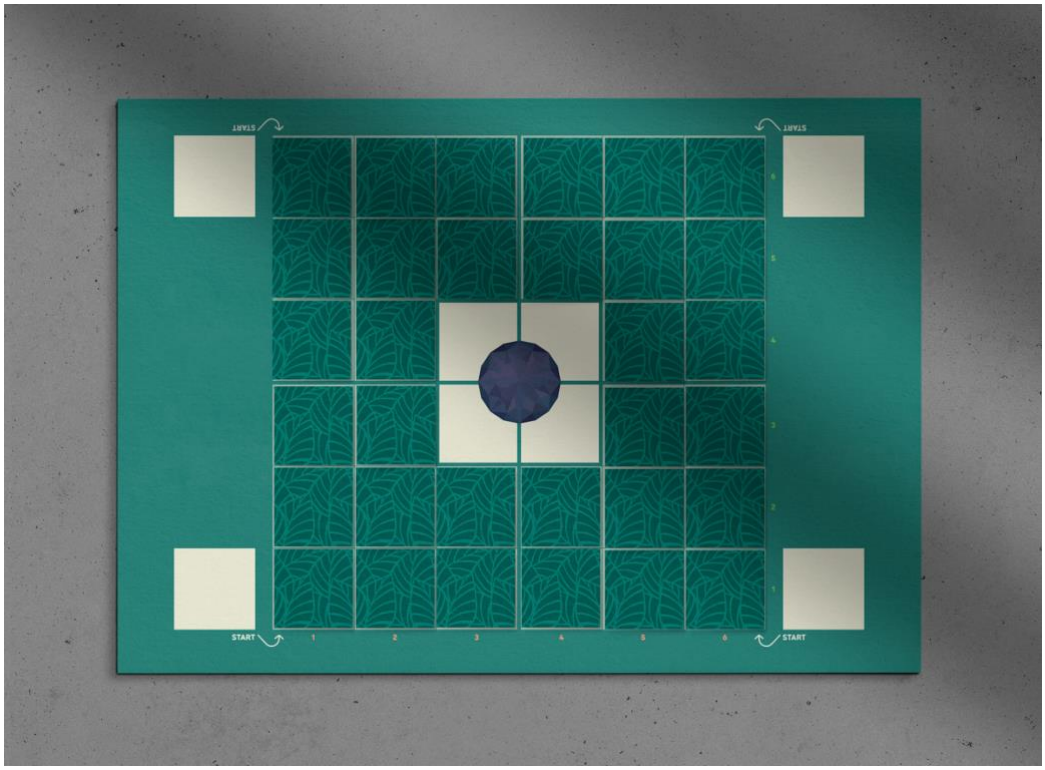

Figure 12 - Game board before the start of the game

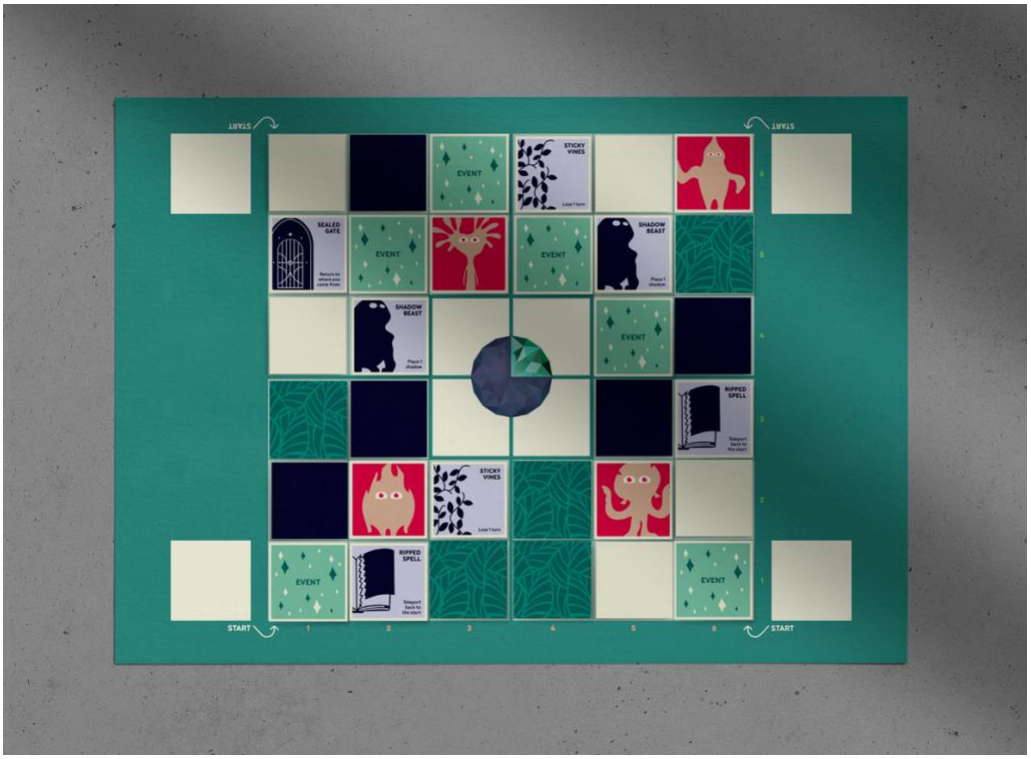

Figure 13 - Game board during play

Figure 14 - Creature tiles

Figure 15 - Creature tiles

Figure 16 - Trap tiles

Figure 17 - Trap tiles

Figure 18 - Blank tile and back

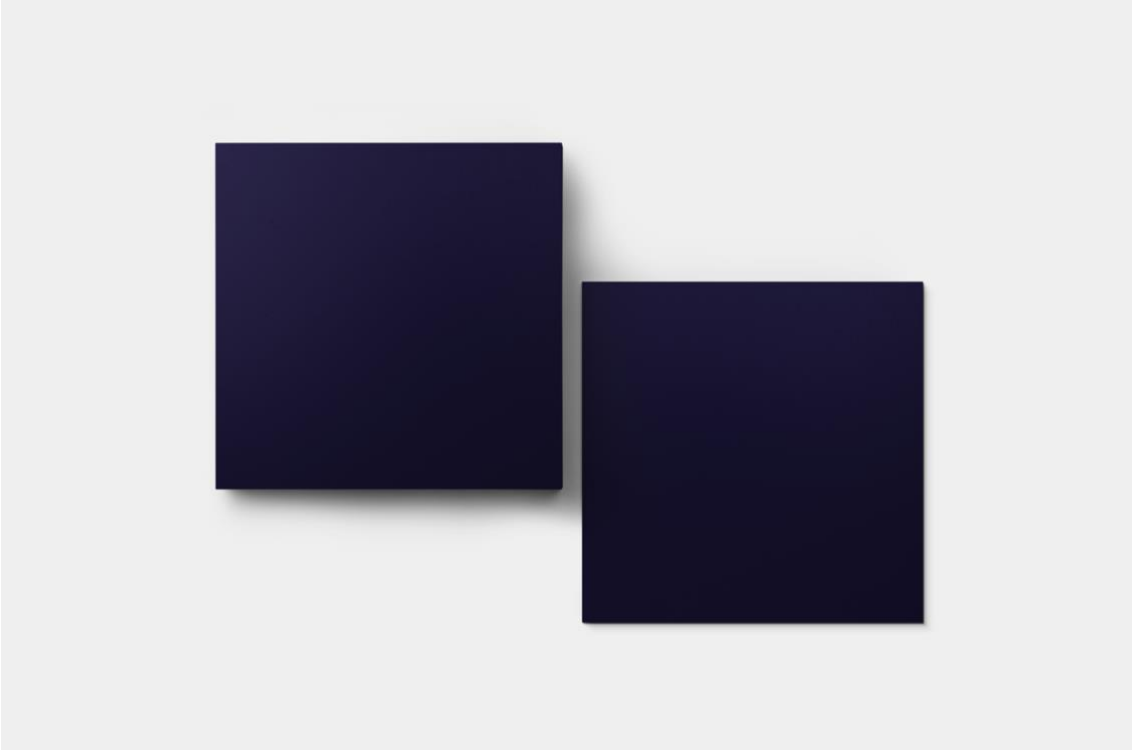

Figure 19 - Shadow tiles

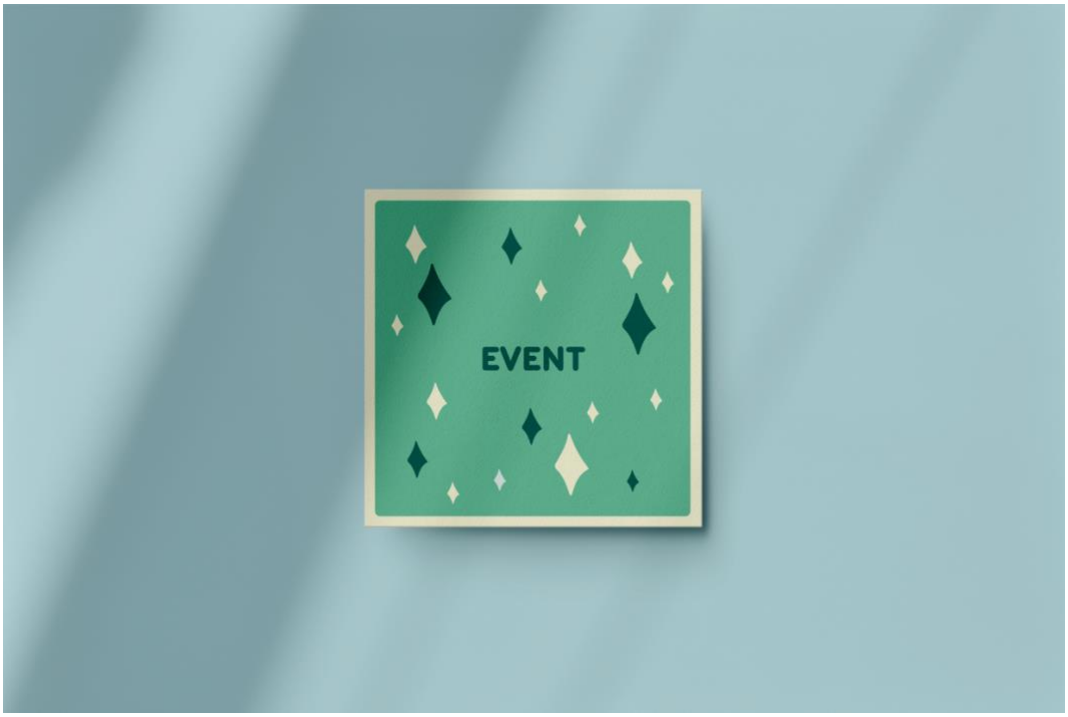

Figure 20 - Event tile

Figure 21 - Event cards

Figure 22 - Shadow challenge cards

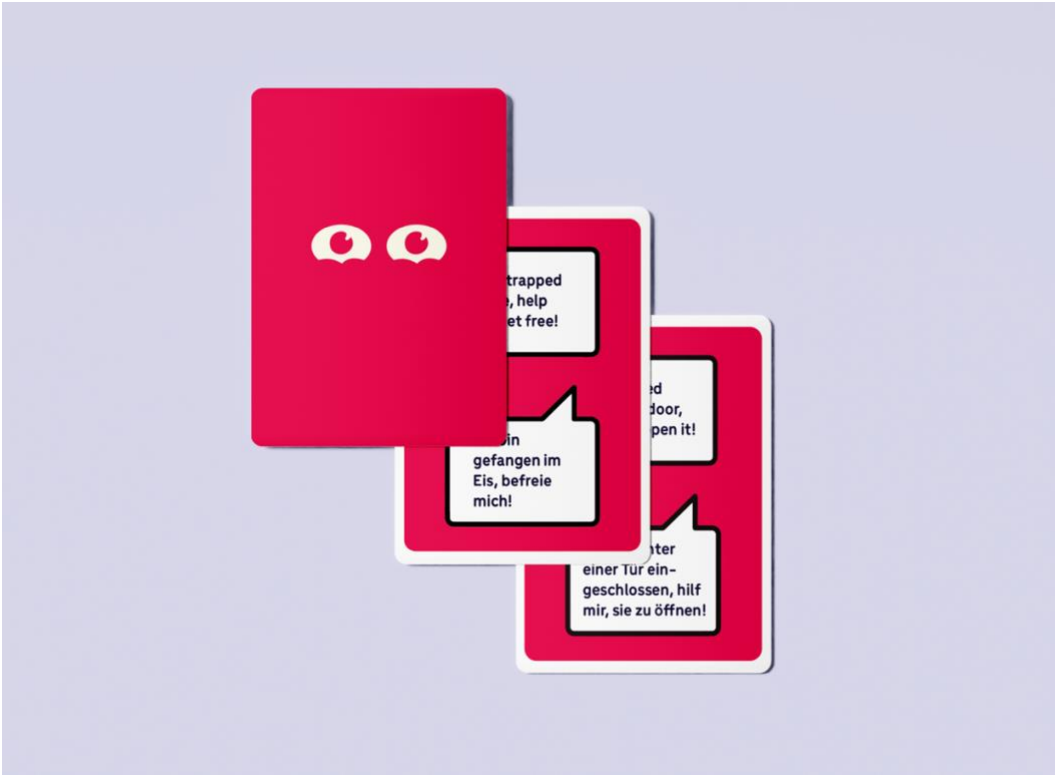

Figure 23 - Creature cards

Figure 24 - Nouns

Figure 25 - Verbs

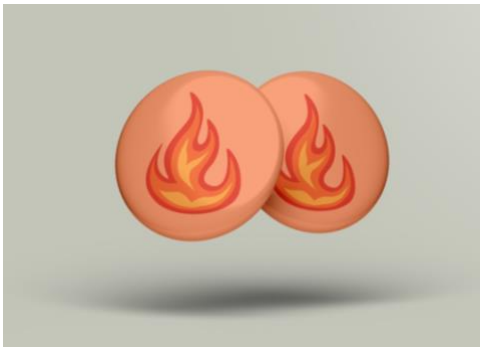

Figure 26 - Torch token

Figure 27 - 'the' card

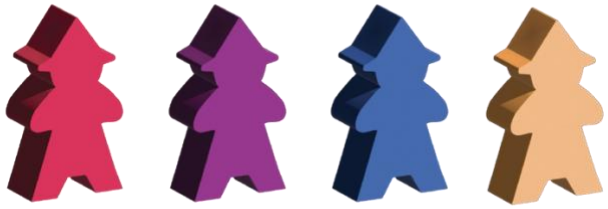

Figure 28 - Playing figures

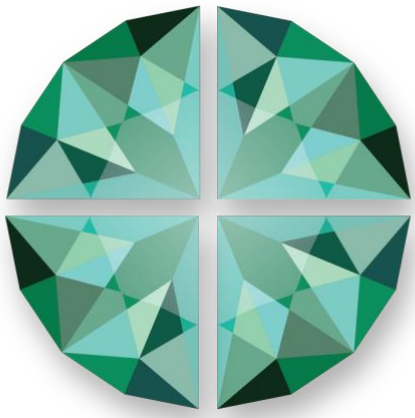

Figure 29 - Diamond pieces

Figure 30 - Spellbook

Chapter VI – Playtesting

During the development of the game, several playtests were conducted to improve the game design. The first tests focused on evaluating the core mechanics, assessing what worked well, and observing the overall gameplay with students and adults. The final playtest was conducted with primary school children to evaluate the accessibility, engagement, and interaction of the game with the intended younger target audience. The following section presents the results of each playtest and outlines the decisions made during the different phases, as well as the further development of the game based on feedback and observations throughout the playtest process.

Although the game mechanics evolved a lot during development, some core elements stayed the same. These fundamental aspects are described here and won't be repeated in the individual playtest descriptions, so we can focus on the most important changes. From the start, the game was based on the "fog of war" principle: tiles stayed hidden until you stepped on them. This mechanic remained unchanged throughout development, as did the central goal of exploring the game board to find creatures and help them with spells.

5.1 Test I

Duration: Game not completed
Players: 2 (myself and one participant, age 24 and 21)

Components: Game board, hexagonal tiles (challenges, events, creatures, libraries), dice, word cards, challenge cards, event cards, creature cards, spell book

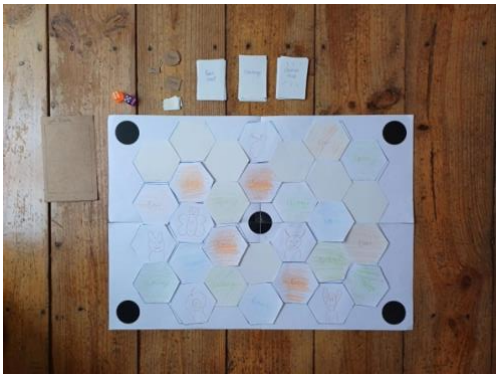

Figure 31 - Game prototype

5.1.1 Used Rules

In this version, both library tiles and creature tiles were hidden across the entire game board. The main objective was to find the creatures to discover what they needed and to find the library tiles to collect words. An important mechanism was that every time a player stepped on a tile, it was revealed to show what was underneath. When a player reached a library tile, they could roll the dice to determine how many word cards they would receive. There were also challenge and event tiles, and movement was limited to one step per turn to a neighboring tile.

5.1.2 Analysis

The game began slowly due to uneven shuffling of the tiles, which resulted in all library tiles being clustered together and inaccessible. As a result, we could not retrieve any word cards in the early stages of the game. Although we quickly uncovered all of the creature tiles, we lacked the necessary words to interact with them. The other player was confused about the point of the game, as the creatures seemed to have no function without word cards. The challenge cards seemed random and unrelated to the game, so they hardly led to any useful interactions. Due to these issues and the lack of excitement, we didn't finish the game.

5.1.3 Conclusions

Removed challenge tiles. Introduced the idea of removing libraries and finding a more reliable method to distribute word cards.

5.2 Test II – Self-Test

Duration: 25 minutes

Players: 2 (self-testing simulation)

Components: Game board, square tiles (events, traps, creatures, empty), shadow tiles, dice, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

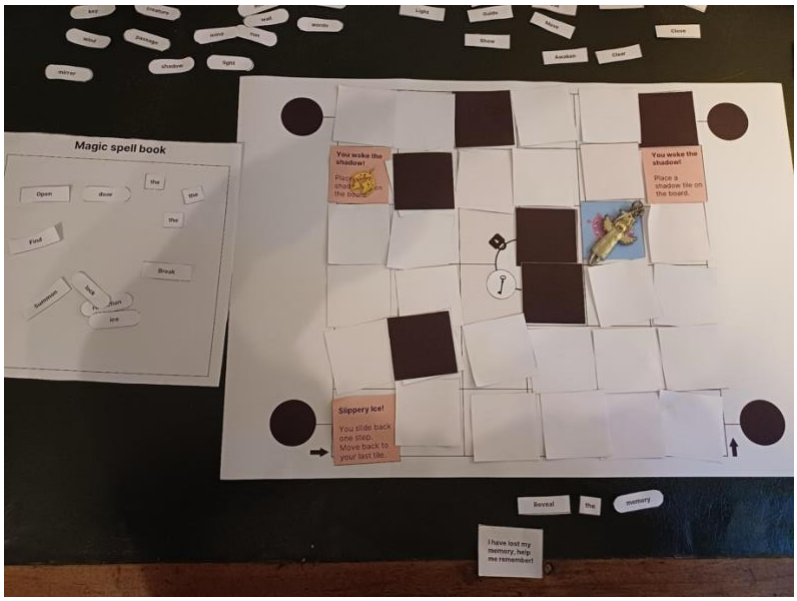

Figure 32 - Game prototype

5.2.1 Used Rules

Several changes were made to the game mechanics to support the introduction of the shadow element, which features a common enemy to play against. The board was changed to a 6×6 square grid to allow for coordinate-based shadow placement: after each round, a shadow tile is placed by rolling two dice and interpreting the result as coordinates. If the entire board, or the four center tiles, is covered in shadow, the players lose.

Dice mechanics were also adjusted. Instead of using libraries to collect words, players now roll the dice to decide how many steps to move and how many words to take. Trap tiles were introduced, which always result in negative outcomes and must be avoided. Challenge tiles were removed and replaced by shadow challenge cards: players may now step onto a shadow tile and draw a challenge card. If the task is successfully completed, the shadow is removed.

Creature mechanics were streamlined to include only four creatures on the board. Helping a creature rewards the player with a key. To win the game, four keys must be collected. Additionally, torch tokens were introduced, allowing players to reveal a tile before stepping on it.

5.2.2 Analysis

During this self-test, several observations were made regarding pacing and clarity. Setting up the game, particularly laying out word cards and tiles, took some time, partly due to the use of paper components. Movement and word collection using dice felt overly fast and unbalanced, making it

too easy to collect a large number of words in a short time. Also, moving on the board and revealing tiles was too easy by using the new dice mechanic. All creature tiles happened to be placed in the same corner, which reduced the sense of exploration. Some questions came up during play, such as how the game should end and when players are supposed to place the keys. Additional questions were raised about specific mechanics: for example, what happens if a player is already on a creature tile and chooses not to move in the next round yet rolls a five, resulting in collecting too many words? There was also uncertainty about whether used words are removed from the game, what to do if a shadow tile is placed on an existing shadow, and whether players can choose which tile gets removed when a shadow effect occurs.

5.2.3 Conclusions

Several adjustments had to be made based on the playtest. A different approach for collecting words and moving was necessary, or alternatively, a die with smaller numbers could be used. To address this issue, a new idea was introduced: using hidden treasure chests as a source for word cards. Additionally, the creatures were each placed in a separate corner to make them easier to find and to avoid clustering. Player movement was adjusted so that players can now choose to move either one or two steps per turn.

5.3 Test III

Duration: 35 minutes

Players: 2 (myself and one participant, ages 24 and 26)

Components: Game board, square tiles (events, traps, creatures, empty, treasure chest, trade point), shadow tiles, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

Figure 33 - Gameboard prototype

5.3.1 Used Rules

Several changes were made to the game mechanics to create a smoother process for word collection and movement. Players can now move only one or two spaces per turn. Additionally, four treasure chest tiles were introduced, each providing three words, which ensures that players have enough words to build four spells. While designing these tiles, I realized that each spell must consist of a verb, a connector, and a noun; otherwise, it is impossible to obtain enough words from the treasure chests to form complete spells. Furthermore, I noticed that players sometimes do not know which words they need yet. To address this, trade point tiles were added, allowing players to exchange one word in their possession for another.

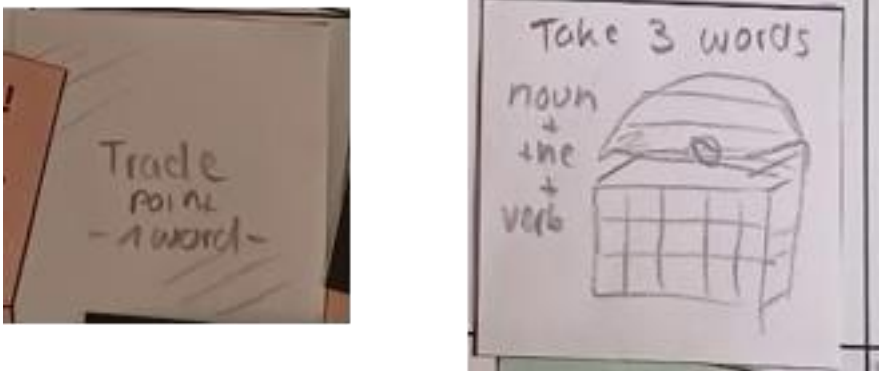

Figure 34 - New game components

5.3.2 Analysis

We didn't find the treasure chests until late in the game, and since we had no words at the start, we couldn't trade anything. I hadn't placed the treasure chests evenly across the board, but shuffled them with the other tiles, so it would definitely help to put one in each quadrant. Despite this, I still felt the word acquisition was too random and not dynamic enough. By the time we could pick words, we already knew what we needed.

The negative tiles and some events that cause players to lose a word no longer worked effectively because once words were lost, there was no way to regain them.

A possible improvement could be a rule where everyone rolls the dice once per turn, or the dice is rolled once per round, and if someone rolls a six, that player may take an extra word in addition to those from the treasure chests. Another idea is to start the game with some random words or award a word every time a six is rolled. There could also be more places to get words, potentially forcing players to blind draw instead of choosing, which would encourage them to think more strategically about how to use the words they have.

An interesting physical design idea is to have the words attached to the tiles magnetically, so players find the words stuck to the tiles as they reveal them.

The movement rule of one or two spaces worked well, providing a good pace to the game.

The shadow mechanic was understood and effective. The participant suggested that players should not be able to move over a shadow tile; instead, they must move around it or remove it first, making shadows a more significant obstacle that requires active interaction. During the game, a shadow tile only landed once in the middle of the board.

We lost all the events because the dice rolls were consistently between 1 and 3, which always resulted in placing an extra shadow tile rather than removing one or stopping the spread.

Torch tokens are a nice addition, but were rare in the session. We only got two tokens, and only I received them.

The requirement to form six-letter words might be too challenging for younger players. A three-letter word option could make the game more accessible for children.

Overall, the participant liked the game, describing it as dynamic and engaging. She found that while there was a lot happening, it was not overwhelming, and the main challenge was figuring out the word component.

Some tiles were difficult to distinguish between being empty or not yet revealed, indicating a need for greater color contrast or clearer design.

During the game, several questions came up:

- If you remove a shadow tile, are you allowed to perform the action underneath it afterward?
- Can a player cross a shadow tile?
- Do players need to bring the key to a specific location?

5.3.3 Conclusions

The following actions need to be implemented to improve the game based on playtest feedback: every player must roll the dice on their turn, and if a six is rolled, the player can take an extra word. The treasure chest tiles should be placed in each quadrant. Empty tiles should be colored differently from the backs of the tiles to clearly indicate whether they have been turned. The event cards need to be corrected by changing all instances of "roll the die" to "roll the dice." Additionally, players must not be allowed to cross shadow tiles; they should either move around them or remove them before proceeding.

5.4 Test IV – Self-Test

Duration: 40 minutes
Players: 4 (self-test simulation)

Components: Game board, square tiles (events, traps, creatures, empty, treasure chest, trade point), shadow tiles, dice, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

5.4.1 Used Rules

The rules remain the same as in the previous version, with the addition that players must roll the dice on their turn, and if they roll a six, they may take an extra word. Players are not allowed to

cross shadow tiles; they must either move around them or remove them before proceeding. Additionally, treasure chest tiles will be distributed evenly, with one placed in each quarter of the board, similar to the placement of creature tiles.

5.4.2 Analysis

During the game, a total of eight sixes were rolled in thirteen rounds. Four words were lost during the game, and at least once, a word was lost even though no more could be lost. At the end of the game, I had collected enough words to continue playing, but resources seemed limited and almost insufficient.

5.4.3 Conclusions

As a conclusion, it is necessary to review resource management and find a balance that ensures collecting words is neither too easy nor too difficult.

5.5 Test V

Duration: 20 minutes

Players: 4 (participants aged 25, 25, 29, and 30)

Components: Game board, square tiles (events, traps, creatures, empty, treasure chest, trade point), shadow tiles, dice, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

5.5.1 Used Rules

The rules remained the same as in the previous version of the game, with a few additions. Shadow tiles are no longer placed randomly; instead, their placement is always determined by rolling the dice. Additionally, each player rolls the dice at the beginning of their turn, and if they roll a six, they may take one extra word. To ensure more balanced access, treasure chests are now distributed evenly across all four quadrants of the board.

5.5.2 Analysis

During the playtest, it became clear that not enough shadows were created when played with four players, which affected the challenge and tension of the game. To improve the game’s ending, an

action could be introduced where players turn an element in the middle of the board to make the creatures happy, serving as a clear win condition.

Players often picked up tiles to read them, so adding a card with an instruction overview, similar to those commonly found in games, would help clarify the rules and reduce the need to handle components repeatedly. For example, the card could summarize turn order, movement rules, and special tile effects.

The torch tokens were useful by allowing players to look at a tile. The participants noted that it would be better if, instead of turning the tile, the person could peek under one tile once without flipping it.

Letter cards were found to be too difficult, especially for younger players, so reviewing and possibly simplifying them is necessary. Additionally, introducing a new trap tile, such as one that sends a player back to the start, was suggested.

Only three of the four treasure chests were needed during gameplay.

Early in the game, strategic play was limited because players did not yet know what the creatures wanted, which impacted engagement and planning.

Several questions arose during the game, including whether two players can occupy the same tile (players indicated this was not allowed), whether players are allowed to stay on their current tile without moving, and whether trading words is mandatory.

5.5.3 Conclusions

Several refinements should be made to improve the gameplay experience. The torch token should only allow players to peek at a tile without turning it permanently, encouraging memory and strategic planning. The word "lead" should be added to the word set. A new rule should state that two players are not allowed to occupy the same tile. Additionally, an instruction overview card should be created, as used in other games, providing a quick rules reference during play. Finally, there should be a way to create more shadows, not only at the end of each round.

5.6 Test VI

Duration: 35 minutes

Players: 2 (myself and one participant, age 24 and 23)

Components: Game board, square tiles (events, traps, creatures, empty, treasure chest, trade point), shadow tiles, dice, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

5.6.1 Used Rules

The rules remained the same as in the previous test, with one new addition. A custom action die was introduced to add variety and structure to each turn. At the beginning of every turn, the player rolls the die to determine their action:

- 1 – Gain a torch
- 2 – Place a shadow
- 3 – Gain a torch
- 4 – Take a word
- 5 – Place a shadow
- 6 – Take a word

5.6.2 Analysis

Rolling the custom dice with defined actions felt more structured and less random than only rolling for a six. However, the current number-based system (dice with numbers) created confusion, especially in a two-player game with frequent dice rolls. Switching to a symbol-based dice could improve clarity and make the gameplay feel more intuitive.

One suggestion is to include one event symbol on the die to trigger special actions or interactions.

The event cards feature tasks where the dice is simply rolled for event outcomes, which wasn't very engaging. It may depend on the player, but this should be tested further with children to assess excitement and engagement levels.

The trade point tiles don’t make sense. They are always found when the players haven’t gained any words yet or when the creature's request is still unknown.

The shadow mechanic was active throughout the session. With only two players, placing a shadow after every turn felt overwhelming, although the total number of shadows placed during the game was manageable. This balance should be monitored in larger player groups.

Some ideas for new events and shadow challenge cards included:

- **Event:** Read a tongue twister aloud
- **Shadow Challenge:** Find the word that does *not* fit (e.g., "green, tree, yellow, red, brown" or "hand, leg, knee...")

A question that came up was: “What if you collect words and already have all the ‘the’ when you find a treasure chest?”

5.6.3 Conclusions

To improve the gameplay, a symbol-based dice should be tested next, and challenges and event ideas should be added to the cards. The trade point tiles are going to be replaced with libraries on the side of the gameboard, to access them when needed.

5.7 Test VII

Duration: 40 minutes
Players: 4 (myself and three participants, age 24, 21, 22, and 23)

Components: Game board, square tiles (events, traps, creatures, empty, treasure chest, trade point), shadow tiles, dice, word cards, shadow challenge cards, event cards, creature cards, magic spell book, keys, torch tokens

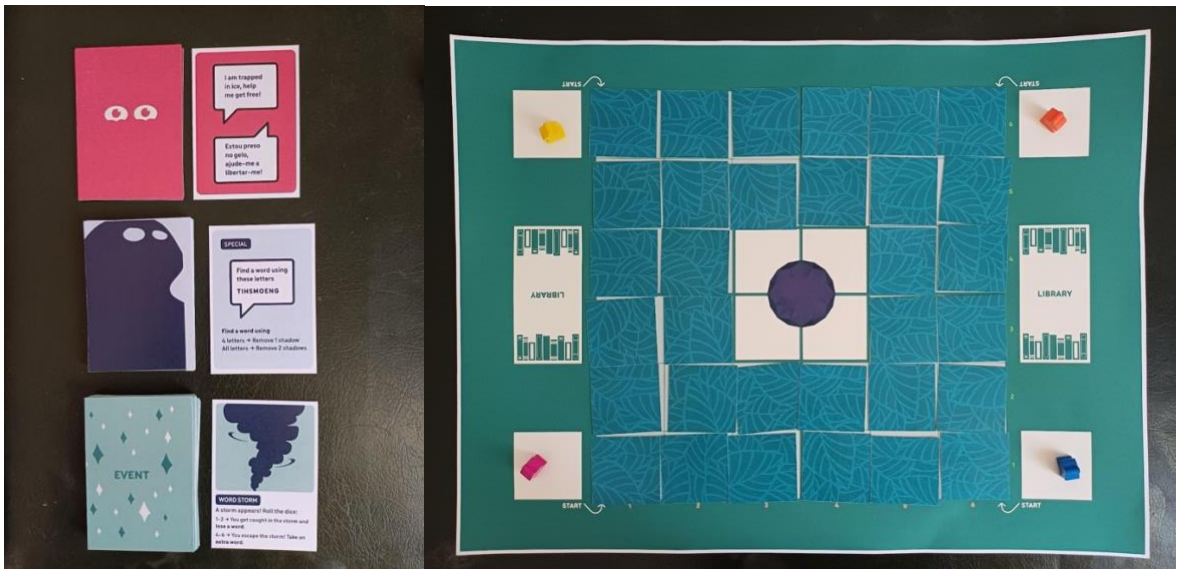

Figure 35 - Gameboard Spell

5.7.1 Used Rules

The game followed the same rules as the previous version, with the following additions and adjustments:

A new symbol-based dice was introduced to replace the number-based dice. One of the "gain a torch" outcomes was replaced with an event. The updated symbol distribution is as follows:

- 1 – Gain a torch
- 2 – Place a shadow
- 3 – Trigger an event
- 4 – Take a word
- 5 – Place a shadow
- 6 – Take a word

Library tiles were removed from the main board and added to the side instead, functioning as a support mechanic outside the exploration area.

Event and challenge ideas were added.

5.7.2 Analysis

During this session, we ran out of shadow cards, indicating the need to increase the number of available cards. There were also too many torch tokens in circulation, suggesting they should be more limited or harder to obtain. One unclear situation arose when a shadow landed on a tile occupied by a player. Despite these issues, all players enjoyed the session, and the game remained engaging throughout the time played. Two of the participants had a low level of English and learned some new words; however, the term “torch token” was too difficult and can be switched with the term “fire token”.

Additional gameplay questions included: What happens if you collect words and already have all the “the” cards when you find a treasure chest?, and should the game stay completely in English?

One thought was that everything in English would be good to learn more words, but it really depends on the level of English.

5.7.3 Conclusions

To improve the game, there should be more shadow challenge cards so that it is not too repetitive. The torch token is going to be replaced with the term fire token. The dice should be changed and not include one torch token.

5.8 Test VIII - primary school

Duration: 1 hour

Players: 4 (participants aged 6, teacher observed)

Components: Game board, game tiles (creature, empty, event, traps), shadow tiles, creature cards, shadow challenge cards, event cards, fire token, diamond pieces, wooden game figures, word cards (verbs, the, nouns), spell book, two dice (orange & green), wooden dice with symbols, rulebook with story, dice explanation card.

Figure 36 - Playtest in primary school

5.8.1 Used Rules

Same base rules as the previous version. The “torch token” was renamed to “fire token” to support clearer language. Additional shadow challenge cards were created. The fire token is no longer part of the dice mechanics. A custom symbol-based dice was used with the following actions:

- Teleport – move to any revealed tile on the board
- Place a shadow
- Event
- Take a word
- Place a shadow
- Take a word

Process

I read the story of the game in front of the entire class before the game:

“*In a quiet, magical forest, there was a bright and powerful diamond. It kept the forest full of light, life, and magic.*

But one day, a dark creature called the Shadow Beast appeared. It broke the diamond into four pieces and spread shadows all over the forest. The forest grew cold and dark.

The forest creatures tried to bring the pieces back, but the Shadow Beast cursed them, and now they’re stuck. They need your help!

You and your friends are magicians. Use your magic words to break the curse, help the creatures, and collect the diamond pieces. Bring all four pieces back to the center of the board to restore the light and save the forest—before the Shadow takes over completely!"

Then I left the room with four children, and they played the game. The teacher came by for some time and observed.

5.8.2 Analysis

The whole class was immediately excited about the story. Everyone wanted to join in, even though only four children could play. They were curious, asked numerous questions, and were emotionally invested from the start. When I told the story, they were even asking how to help the creatures and were very curious about it.

After the game was set up, everyone chose a color and placed their token on the start. There was no rule about who should begin, so they played a game of rock-paper-scissors to decide. The first player was excited to see what was under the first tile. They loved turning tiles and reacted strongly to what they found underneath. The shadow mechanic made them a bit scared to lose the game in a fun, exciting way, which added a lot of tension.

One child wanted to roll a shadow, but the others didn't, so there was a lot of interaction between them. They helped each other, discussed their next steps, and tried to remember where things were after peeking under tiles. They liked the event cards, where they had to roll the dice for an outcome, and were extremely happy if it was a good one.

The turn structure was complicated at the beginning. They weren't always sure how far they could move and often asked me or just guessed. But after a few rounds, they got the hang of most of it. Placing the shadow using coordinates was also difficult at first. It required a lot of focus, and I had to explain it several times. Some kids eventually picked it up, but it wasn't very intuitive for 6-year-olds.

The dice added excitement, but since it was just a wooden block, it didn't really roll; it just dropped on one side. Still, it introduced nice actions like gaining words, placing shadows, and triggering events. However, some kids forgot they could still move after rolling the dice, and having an event before moving and then another event after movement felt like too much. It was good that more

shadows were created than in earlier versions, but rolling the dice repeatedly to determine shadow placement started to feel overwhelming.

During the game, they thought they could use spells to remove the sticky vines or the shadow. They also wanted to use the fire token against the shadow. Their logic in forming spells was based on what might help against something—for example, they searched for the word "water" because it made sense to them that water would put out fire.

They were constantly looking at the words on the table and wanted to collect them right away—they didn't want to wait to find a treasure chest. It was taking too long, so I just let them pick the words, and the game still made sense. I also didn't make them return to the creature tile when casting the spell because it would have taken too long.

The main mechanic of searching and creating spells were fun for them. They tried to remember where things were and discussed it with each other. One kid said, "I would buy your game," and another said, "That game is the best game in the whole world." They wanted to keep playing and even wanted to go again after we had already played for an hour.

The teacher asked, "Who decides if a spell works? Is it the group?" and also asked what the library tiles are for. The children didn't miss the library tiles and didn't ask about them. Overall, it was a long session, and they initially needed time and guidance, but they stayed engaged, asked questions, and had a lot of fun.

5.8.3 Interview

After the game, there was an interview conducted with the teacher. The interview was an open interview with some questions to get some guidelines, and continued with follow-up questions based on the teacher's answers. Both the preparation for the interview and the complete transcript can be found in Appendix 2.

The interview provided valuable insights into the play element in education and a teacher's view about the effectiveness and potential of the board game in an educational context. Overall, the teacher was very positive about the game and highlighted the high level of engagement and emotional involvement of the children. Initially, she had some concerns that the game might be too complex for the age group (around six years old), but these concerns were alleviated after a few rounds of playing. The children quickly got used to the rules and began to handle elements

such as placing the shadows independently, and also reminded each other of their placement after each round.

In addition, the teacher mentioned that elements such as the story, the creatures, the shadows, and the diamonds were especially engaging to the children and played a big role in their enthusiasm. Moreover, she thought the elements were age-appropriate, and the game's complexity and narrative depth made it enjoyable not just for this age group but also for older children and even adults.

Although board games are not used regularly in her lessons due to curriculum restrictions and time constraints, she recognized the educational value of games, especially when they combine learning with fun, which increases student motivation and engagement.

As for future use, the teacher said she was open to using the game in extracurricular settings such as school clubs and confirmed that the children themselves were very interested in playing it again. Furthermore, she pointed out the need for more explicit rules for forming words, for instance, whether certain word combinations are predetermined or can be freely interpreted by the group. She suggested including basic rules for the sentences connected to a problem, with the option of flexible group discussion to avoid children arguing about the spelling.

Finally, she believed that after a guided session, the children would probably be able to play the game independently if there was at least one child who could read in the group.

5.8.4 Conclusions

The children were very immersed in the game, and the story provided a good foundation for engagement and emotional connection. Turning over the tiles, interacting with the shadow, and forming spells created excitement and cooperation among the children. However, some practical adjustments are needed to improve the gameplay for this age group. The movement and turn structure was initially confusing, and certain elements, such as shadow placement using coordinates, were too complex for this age group without assistance.

The test showed that the game is very flexible and that there can be different versions or rules for different age groups. For this age group, the treasure chests should be removed, and the words collected as needed. The symbol die should also be reconsidered if it is too confusing or only intended for this age group.

This was an extreme case with the youngest possible group. It is definitely not possible to play the game with younger children, but it should not be a problem with older children.

The enthusiastic feedback from both the children and the teacher shows the potential of the game. Nevertheless, some mechanisms need to be simplified, rules clarified (e.g., who decides whether a spell works), and the game components adapted for younger players. Overall, the game session showed that the game concept is solid, entertaining, and engaging, especially with further refinements and adjustments for the target age group.

PART III - Final Considerations

Chapter VII – Discussion

To answer the research question, "How can a tabletop learning game be designed to improve English as a second language for children aged six and older?" a project was developed to create an educational tabletop game. This project aimed to explore the potential of board games for improving language acquisition while exploring the role of play-based learning and social interaction in children's motivation and engagement.

As observed during playtesting, storytelling plays a crucial role in establishing an emotional connection, which is consistent with Breault's (2020) theory that narrative design promotes player immersion in the game. The children immersed themselves in the magical world and responded with enthusiasm to the elements of the story, similar to the case study on *Wer war's?* where the narrative also encouraged engagement. I observed that the children were eager to save the creatures by forming spells using the vocabulary. Moreover, they were, in fact, so excited that they couldn't wait to look at the words and form sentences. This supports the objective regarding the influence and motivation in second language acquisition, as noted by Paatsch et al. (2023), who emphasize the value and effectiveness of playful learning environments.

From a design perspective, the project prioritised mechanics that could support language learning without making the experience feel instructional, or strictly pedagogical. Instead of relying on quiz-like formats or explicit vocabulary drills, linguistic goals were embedded in the actual game mechanics. For instance, the spell-casting mechanic was not simply a narrative trick but a intentional design choice to encourage structural experimentation and vocabulary recall. This mechanic is central to the game. It encouraged children to move between word recognition, combination, and verbal articulation, aligning language production with in-game decision-making. This integration illustrates how game design can support learning by linking a specific designed experience with learning objectives.

Also, the physicality of the components—the tiles, the board, and the tactile manipulation of cards—also played a central role in the design process. By manipulating tiles or collaboratively

decoding clues, children weren't just playing; they were engaging in embodied and collective meaning-making. Designing for physical interaction helped to encourage the children's participation and reduce their cognitive load, allowing language learning to take place more naturally through play.

Also, if children are fully engaged, as seen in the playtest when they try to form spells or solve shadow challenges, they are more likely to experience deeper learning. This was clear during the playtest when children enthusiastically repeated vocabulary, experimented with word combinations, and corrected each other. These moments reflect what Kirschner and Hendrick (2020) argue: what learners focus on determines what they learn.

Additionally, the spell-casting mechanism aligns with Craik and Lockhart's (1972) Levels of Processing model, which highlights that deeper mental processing leads to better recall. The children were not simply repeating vocabulary. They were applying it to different situations and using it to solve problems.

Furthermore, Clark & Paivio's (1991) Dual Coding Theory implies that people learn better when both verbal and visual channels are activated. During the game Spell, visuals such as tiles and cards, written words on spell cards, and spoken language, through communicating the formed sentences, were combined, which leads to better memory retention.

The playtest showed that the use of hidden information, such as face-down tiles and unknown creature locations, was particularly effective in creating motivation and engagement. This element created a sense of uncertainty and curiosity, challenging players to make a decision without full knowledge of the situation. This concept was explored in Tadelis' (2013) application of game theory, where strategic decisions must be made with incomplete information. During playtesting, this led to discussions between the players, which improved their verbal interaction and their problem-solving skills.

The collaborative nature of the game led to them helping each other. During the playtestI observed the children helping each other, forming sentences, or even correcting each other. So younger children could learn from a more competent child, since the knowledge level was mixed. This is supported by both Vygotsky's (1978) theory of the zone of proximal development and Paatsch et al. (2023), who highlight that children learn from a more competent other through peer teaching.

This supports the third research objective by demonstrating how analog games encourage face-to-face communication, which creates opportunities for collaborative learning .

These findings also support theories by Chomsky (2003) and Pinker (1998), who argue that language is an innate human ability. Pinker suggests that children acquire language instinctively when exposed to meaningful communication. The game created such an environment through storytelling, peer interaction, and the use of vocabulary, helping children internalize language naturally as the game unfolded.

Some design elements, for instance using coordinates to place the shadow tiles, proved to be too complex for most of the younger children during the playtest; Which aligns with Piaget's (1952) theory that cognitive development stages impact problem-solving ability. These elements may work better with older children who have a stronger understanding of abstraction (concrete operational stage), highlighting the need for age-specific adaptations.

Chapter VIII – Conclusions

This project demonstrates that game design can play a role in creating engaging environments for children learning English as a second language. Using a research through design approach, the project explored how mechanics such as narrative, hidden information, and collaborative play support motivation, communication, and language use.

A key takeaway is that design can play a role in engaging experiences. Through playtesting, it became clear that especially narrative context promotes emotional engagement. Mechanics like hidden information encouraged exploration and especially engagement. the collaborative nature of the game led to excitement, curiosity, and verbal communication.

Overall, I learned how useful it is to quickly test versions of game mechanics. From my experience with this project, it is clear that iterative cycles are not just abstract, theoretical ideas but key to a deeper design process. What initially felt like an intuitive and exciting mechanic could turn out to be reconsidered when tested with actual players. I also learned to let go of certain mechanics that I initially really liked, but just didn't work in the context of the game, or for a specific age group. At the end, making the game a bit simpler and stripping away elements from the concept made the game more enjoyable and stronger, only focusing on some strong key mechanics.

The research question "How can a tabletop learning game be designed to improve English as a second language for children aged six and older?" has been addressed through the insights gained during research through design and playtesting. By combining storytelling, interaction, and cognitive challenges, tabletop games can create language learning experiences without feeling like a lesson or homework. All the objectives have been addressed: The project demonstrated how tabletop games can support language acquisition, how playful mechanisms promote motivation and engagement, and how valuable personal interaction is for collaborative language learning.

Ultimately, children love to play a good game, and when designed with intention, gameplay can become more than just fun. It can offer real educational value, helping children learn a language in a way that feels natural, rather than a chore.

6.1 Limitations

This study had several limitations that need to be acknowledged. First of all, the theoretical framework was limited to existing literature on language acquisition, game design, and play. While these sources provided a strong foundation, they may not capture the full diversity of current research in these fields. Moreover, the selected case studies influenced the design process. These were useful for comparative analysis, but they may have constrained the design by focusing on certain types of games and mechanics, despite being successful examples and providing insights into what already works.

In terms of playtesting, one limitation was the test group. For quick iterations, the game was mostly tested with students to evaluate if the mechanics functioned as intended. Finally, the game was tested with six-year-old children. While this provided valuable insights into the lower end of the target age range, it also presented an extreme case. The findings may not fully represent how the game would perform with slightly older children, who might have more developed cognitive skills.

6.2 Recommendations for Future Research

Future research could investigate how this game performs with older children or in a classroom setting over time. In addition, different skill levels and varied versions of the game could be tested, including refined or advanced mechanics matching specific age groups or abilities. It might also be useful to explore whether the game can be scaled up for larger groups by testing versions that support more players simultaneously. This would increase its applicability in classrooms or group learning environments and test the dynamics of collaboration and communication on a larger scale.

Furthermore, incorporating auditory input in an analog way, similar to the game Wer war's? could create a more immersive experience and support language development through enhanced listening opportunities.

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Appendix

Appendix 1 – Case Studies

Table 1 - Comparative Table of Case Studies

Game	Core Mechanics	Educational Applications	Ideas based on the game
Wer war's?	Cooperative gameplay, memory, storytelling, time pressure, interactive electronics	Teamwork, logical deduction, sequencing, narrative reasoning, memory retention, task-based progression	- Talking box: players enter numbers from spell cards to hear part of a spell or the whole spell - Players move through different rooms - Rooms have creatures that players must interact with - Key collection: getting keys from creatures - Time pressure: chest announces
Monopoly	Resource management, negotiation & trading, competitive dynamics, chance and unpredictability	Financial literacy, budgeting, basic economics, consequence planning, risk management, probabilistic thinking	- Players land on fields multiple times to collect vocab - Mystical stroll cards (helpful: extra spell, free movement, bonus key; harmful: curses, word swaps, lost spells) - Jail: player gets trapped (other players must free the trapped player with a spell)
Catan	Resource collection, trading, negotiation, randomness and strategy, cognitive engagement, variable setup	Strategic planning, resource management, trade systems, probability	- Resource cards: vocabulary spell cards - If a player moves onto a library tile each player or that player can take a word card - Different areas for different cards (nouns, verbs) - Dice rolling: move or trigger events (ex. Stealing words, block tile)

Scrabble	Word formation, tile placement, vocabulary recall, cognitive engagement	Language development, spelling, vocabulary, strategic thinking, pattern recognition	- Word cards - Letters to form words for spells
Pictionary	Drawing and guessing, non-verbal communication, time pressure, collaborative play	Visual communication, teamwork, communication skills, fast association, interpretation under pressure	- Drawings to support spells - Players must draw runes or spells - Players form. Spell based on drawn runes
Dixit	Visual storytelling, abstract thinking, interpretation, and associative guessing	Creative thinking, metaphorical reasoning, perspective-taking, interpretive communication	- Players have to think off different spells based on images
Carcassonne	Tile placement, spatial reasoning, role-based scoring, and strategic timing	Geography concepts, spatial awareness, resource trades, visual planning	- Modular bord tiles: build the magical forest (add vocab valley)
Santorini	Grid-based movement, 3D spatial logic, abstract strategy, asymmetry	Spatial reasoning, geometric thinking, planning ahead, logic puzzles	- Players have different powers (asymmetry)

Table 2 - Key Educational Values across Case Studies

Value Area	**Representative Games**
Language & Literacy	Scrabble, Dixit, Pictionary
Math & Logic	Monopoly, Catan, Carcassonne, Santorini
Social Skills & Teamwork	Wer war's?, Pictionary, Dixit
Strategic Thinking	Catan, Carcassonne, Monopoly, Santorini
Creativity & Expression	Dixit, Pictionary, Wer war's?
Memory & Attention	Wer war's?, Scrabble
Spatial Reasoning	Santorini, Carcassonne, Catan

Appendix 2 - Interview

- Open Interview

Questions

- Would you use this game in your class?
- Do you usually use games as a pedagogic tool?
- What do you think are the advantages?
- Do you think it is appropriate?

Transcript

- Interviewee: Amber Pryde (AP), primary school teacher
- Interviewer: Leonie Schäper (LS)

LS: What are your expressions about what you saw/ thought when you were observing the game?

AP: I thought it was really good, and especially after seeing the kids playing it, how much they loved it. I liked how it wasn't too simple, and there were lots of different parts to it. Although at first I was thinking it was gonna be too complicated for them. But like once there were a few rounds, I was like ohh they started picking up the cards by themselves and reminding the others about the shadow that was at the end of the round.

LS: I was really surprised about that, too. I thought that was a point that they would really forget about.

AP: Ah, I think it's really exciting. For their age, it is perfect. Like the story of it and the creatures and the diamonds and the shadows, they loved that.

LS: Do you think the game is also suitable for older children?

AP: Definitely, yeah. I think they might be the youngest you could do it with, and then it could go all the way up to adults.

LS: I already saw you using the board games, which is amazing. Do you usually use games as a pedagogic tool?

AP: It just so happens that we are doing the board games. It's like the magic toymaker topic at the moment, so this is the only time we have actually used board games in class, cause they are making their own. But there is also a lot of like math board games to like practice tables, but I would like to use them more in school, but I don't.

LS: Why not?

AP: Like, there is a certain pressure on the curriculum, like a structure I need to follow, which doesn't include games that much.

LS: What would be the advantages of using them?

AP: I think if they are having fun and they are learning at the same time, then they are more likely to apply for learning. If it is exciting, the more they want to learn.

LS: Would you use this game in your class?

AP: Yeah, we've got loads of clubs, and I think a board game club would be really good, and yeah, we would definitely play this. Especially after them, today loving it, they said they actually wanna play it again.

LS: Could you think of some improvements to the game in your opinion?

AP: Just when we were playing and I asked you, you know, like how we make the three words, like I was just wondering if there was an actual rule for which ones go together. Like, does stop the fire go with a certain thing, or is it up to the group? Is it up to the group, or is there like a rulebook, like fire goes with water, and door goes with lock?

They probably would like to play by themselves, but it might be like "no, I don't think that," and like they disagree with each other. So if there is, like certain board games I know, there are rules, but then as people get to know the board game, they just go "oh, we do our own way". So it might be good to have like the base rules for the words, and then, but in the rulebook, say "oh, you can discuss amongst the group".

LS: Do you think they could play this by themselves without an adult? Now, if they would come together again after they know the rules and played it?

AP: I think so, yeah, as long as there is one in the group like Marc who can read.

Appendix 3 – Shadow Challenge Cards

Find the opposite of		**Finde das Gegenteil von**
	small	klein
	big	groß
	high	hoch
	fast	schnell
	dark	dunkel
	loud	laut
	old	alt
Find another word that means the same as		**Finde ein anderes Wort für**
	scared	ängstlich
	strong	stark
	happy	glücklich
	cold	kalt
	friendly	freundlich
	sleepy	müde
Find a word that rhymes with		**Finde ein Wort das sich reimt auf**
	light	Licht
	cat	Katze
	tree	Baum
	stone	Stein
	time	Zeit
	phone	Telefon
Find a word using these letters	**certauer** --- tea	**Finde ein Wort mit den folgenden Buchstaben**

	create creature	
	stuighnl --- sun light sunlight	
	tihsmoeng --- this some something	
	streaeur --- tea rest treasure	

Appendix 4 – Creature Requests

English	German
I am trapped in ice, help me get free!	Ich bin im Eis gefangen, hilf mir, mich zu befreien!
I am lost in darkness, help me find my way!	Ich bin in der Dunkelheit verloren, hilf mir, meinen Weg zu finden!
I am locked behind a door, help me open it!	Ich bin hinter einer Tür eingeschlossen, hilf mir, sie zu öffnen!
I am stuck in a deep sleep, help me wake up!	Ich stecke in einem tiefen Schlaf fest, hilf mir aufzuwachen!
I cannot move, help me break my chains!	Ich kann mich nicht bewegen, hilf mir, meine Ketten zu brechen!
I am hidden behind a wall, help me pass through!	Ich bin hinter einer Wand versteckt, hilf mir, hindurchzukommen!
I am trapped inside a mirror, help me escape!	Ich bin in einem Spiegel gefangen, hilf mir zu entkommen!
I am surrounded by fire, help me escape!	Ich bin von Feuer umgeben, hilf mir zu entkommen!
I am surrounded by enemies, help me hide!	Ich bin von Feinden umzingelt, hilf mir, mich zu verstecken!
I cannot find my home, help me return!	Ich kann mein Zuhause nicht finden, hilf mir, zurückzukehren!
I am stuck in a maze, help me escape!	Ich stecke in einem Labyrinth fest, hilf mir zu entkommen!
I am tangled in vines, help me cut free!	Ich bin in Ranken verheddert, hilf mir, mich zu befreien!
I am blinded by fog, help me see!	Ich bin vom Nebel geblendet, hilf mir zu sehen!
I have lost my memory, help me remember!	Ich habe mein Gedächtnis verloren, hilf mir, mich zu erinnern!
I am covered in thorns, help me heal!	Ich bin mit Dornen bedeckt, hilf mir zu heilen!

Appendix 5 – Event Cards

Positive:

Found a fire
You get a fire! A fire lets you look at a tile before stepping on it.

Stop the shadow
No shadow tile is placed this turn.

Chance: (positive or negative, roll the dice to decide)

Shadow beast attack
A monster appears! Roll the dice:
1-3: Place 1 extra shadow.
4-6: You scare it away

Word storm
A storm appears! Roll the dice:
1-3: Shuffle all hidden tiles
4-6: Reveal one tile

Lost voice
You are cursed! Roll the dice:
1-3: You can't talk during your next turn.
4-6: You break the curse! Take 1 extra word card!

Magic Maze
You are lost in a magical maze! Roll the dice:
1-3: You stay lost and miss your next turn.
4-6: You find the way out and move one extra step.

Gain something through a task

Toungbreaker
Say the magic spell to gain a torch token.

- A flea and a fly flew up in a flue.
- Four furious friends fought for the phone.
- Fuzzy Wuzzy was a bear. Fuzzy Wuzzy had no hair. Fuzzy Wuzzy wasn't very fuzzy, was he?
- Cooks cook cupcakes quickly.
- Betty bought butter, but the butter was bitter, so Betty bought better butter to make the bitter butter better.

Appendix 6 – Words

10 x the

Verbs
Melt, open, summon, break, use, take, get, find, shatter, cut, lock, fix, close, move, lift, find, hide, reveal, awaken, slice, clear, mend, guide, show, stop, light, bring, unlock

Nouns
Fire, ice, vines, door, lock, chains, creatures, home, way, key, light, fog, ice, path, mind, passage, reflection, mirror, flames, words, air, past, wounds, mist, maze, wind, shadow, memory, voice maze, body, wall, curse