

The Island of Play

Reflections on How to Design Multiuser VR to Promote Social Interaction

Larsen, Lasse Juel; Kristensen, Troels Deibjerg; Walther, Bo Kampmann; Majgaard, Gunver

Published in:
International Conference on Human-Computer Interaction

DOI:
10.1007/978-3-031-05939-1_32

Publication date:
2022

Document version:
Accepted manuscript

Citation for published version (APA):
Larsen, L. J., Kristensen, T. D., Walther, B. K., & Majgaard, G. (2022). The Island of Play: Reflections on How to Design Multiuser VR to Promote Social Interaction. In J. Y. C. Chen, & G. Fragomeni (Eds.), *International Conference on Human-Computer Interaction: HCII 2022: Virtual, Augmented and Mixed Reality: Design and Development* (pp. 465-484). Springer. https://doi.org/10.1007/978-3-031-05939-1_32

Go to publication entry in University of Southern Denmark's Research Portal

Terms of use

This work is brought to you by the University of Southern Denmark.
Unless otherwise specified it has been shared according to the terms for self-archiving.
If no other license is stated, these terms apply:

- You may download this work for personal use only.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying this open access version

If you believe that this document breaches copyright please contact us providing details and we will investigate your claim.
Please direct all enquiries to puresupport@bib.sdu.dk

The Island of Play: Reflections on How to Design Multiuser VR to Promote Social Interaction

Lasse Juel Larsen, Troels Deibjerg Kristensen, Bo Kampmann Walther, and Gunver Majgaard

Published in J. Y. C. Chen and G. Fragoni (Eds.): *Virtual, Augmented and Mixed reality: Design and Development*, 2022, pp. 465-484

Part of the Lecture Notes in Computer Science book series (LNCS, vol. 13317)

https://doi.org/10.1007/978-3-031-05939-1_32

Abstract

This article consists of reflections and considerations concerning a virtual reality design case: *The Island of Play*. It is a multiuser virtual reality prototype aimed at maintaining and encouraging social relationships between long term hospitalized children and their friends. The motivation behind this design is the dire situation long term hospitalized children often find themselves in. They experience isolation and marginalization due to constraints from hospitalization. A consequence hereof is a limited access to social interaction as well as a reduced opportunity to play with friends from either home or school. *The Island of Play* was essentially designed to set up a virtual meeting place to stimulate socialization through play. This article sits at the intersection between game design theory and actual design impressions, with a particular focus on how real-world design interweaves with theoretical considerations. The argument that follows is structured over five sections: 1) First, we contemplate the design of the player's character. 2) Second, we scrutinize the relationship between game objects and playful interactions. 3) Then we move on to consider the design of social experiences, 4) followed by the fourth section where we inspect the value of the magic circle as a design metric. 5) Finally, in the fifth section, we reflect on the importance of weighing the player's sensation of purpose and skill against interacting with the application. Overall, this design case pivots around design issues and considerations involved in the development of play and game scenarios in a multiuser VR-application aimed at bolstering the social fabric between long term hospitalized children and their friends.

Keywords

Virtual reality, Multiplayer VR, Design issues and theory, Development, Virtual playground, Game design theory

1 Introduction

Children and adolescents with long term or chronic illnesses suffer not only from the consequences of their illness, but also from the solitary experience of living apart their known communities. A study made by the Danish state council to ensure childrens' rights, examined the social ramifications of patients who undergo long time hospitalization [35]. The hospitalizations greatly impact the childrens life: they become separated from their school setting and isolated from their friends. The study showed that 25% of the children found their friendships and social relations negatively affected during their hospitalization. Two conclusions were drawn from this: on the one hand, it is important that hospitalized childrens' classmates and friends show understanding, interest, and empathy during their hospitalization [29]; on the other hand, it is vital that the same classmates and friends make an effort to keep in touch with their hospitalized friend. But classmates and friends of the hospitalized children find it difficult to maintain the social bond and share everyday experiences due to constraints imposed by the entire situation of isolation and separation. This dual challenge presents a situation, which we aim to mitigate by creating a third place: a virtual reality playground where the hospitalized child can meet up with their friends and vice versa.

Additionally, the expanding technical possibility of designing interesting multi-player virtual reality applications open new opportunities for design cases [2, 14, 32, 50]. The designs of multiuser virtual reality applications prompt new directions and trajectories for the development of educational games and play oriented scenarios.

In passing, it should be noted that immersive [5, 6, 11, 37, 39] multiuser virtual reality applications herald three-dimensional experiences viewed from a head mounted display [31]. We used wireless and standalone Oculus Quest virtual reality headsets so that no additional equipment was needed, and so that wires wouldn't get in the way and unnecessarily complicate the players' experience. The Oculus Quest headsets use eye-gaze and/or controllers (joysticks) to interact with the content of the virtual world. On a technical note, the oculus quest equipment registers head movements, and the two screens inside the head mounted display support the stereoscopic vision giving the user a sense of depth. The development of *The island of Play* aimed to take advantage of this newest design wrinkle. The methodology known as Design Thinking [3, 26, 27, 33, 34, 56], which forms the base of the following reflections, and which assists and guides the decision making in the development process, is enveloped by a long and wide range of game designers together with insights from formal game design theory [12, 16, 36, 44]. However, the offset of the development of *The Island of Play* was directed toward uplifting social and playful interactions aimed at maintaining and expanding the social networks between physically separated friends. In other words, the reflections and considerations of this design case focuses of the in-situ decision making directed and informed by the existing corpus of game design theory together with the intended users' evaluation (we could not test on actual long term hospitalized children during the corona pandemic). Instead, we play tested on four adolescents 12–19 years of age plus a variety of 4–6

adult users including both software developers and non-technical adults. The tests were done in iterations as part of the development process to guide the design decisions. The software developers were experts and provided feedback on the design and technical details, while the non-technical adults provided feedback on the usability. The feedback we got from the adolescents was mainly centered on playability, while all test informants provided feedback on bugs. This solution was obviously far from perfect; it did however yield important insights on the design.

In the following we shall dive more into how the design of *The Island of Play* combines playfulness, exploration, and character-driven world interaction, and how all this catapult social and meaningful experiences for hospitalized children. First by 1) reflecting on the player's character; 2) second, by thinking about the intersections between game objects and playful interactions; 3) third, by scrutinizing how to best design social experiences; 4) fourth, by inquiring the value of the concept of the magic circle; and finally, 5) by weighing the importance of the purpose and skill acquisition in relation to the overall design of the island. Thus, each section, from player character to play purpose (see Fig. 1 below), is devoted to the entanglement of a specific aspect of game design theory and how it might influence or direct actual design – which will run parallel to continuous play and game tests.



Fig. 1. The five design perspectives on the multiuser virtual reality playground *The Island of Play*.

However, striking an informed balance between theory and praxis is no easy feat. Nevertheless, the driving force behind the design of *The Island of Play* was the aforementioned aim of empowering friendships by enabling social relationships between the long-term hospitalized children and their friends in and out of school. The aspiration was to develop a multiuser virtual reality playground to

alleviate the sensation of loneliness and isolation among hospitalized children by bridging the physical distance and the emotional separation between the everyday life of school and the secluded life lived in the hospital. The following sections highlights our design case, *The Island of Play*, and associated reflections on the challenges of designing playfulness to propel social relationships between physically distanced and isolated friends.

2 The Island of Play

The design of *The Island of Play* showcases an isolated and uninhabited tropical Island. The rationale for choosing this setting for the playground was to establish an emotional warm, evocative, and welcoming place distinctively different from the sterile atmosphere of traditional hospital surroundings. We drew inspiration from the computer game *The Witness* [66], which also features an island filled with natural and man-made structures and a bunch of hidden puzzles. Another inspiration was the game *The Legend of Zelda Breath of the Wild* [62]. Both games present relaxing puzzles for the players to investigate and explore. On top of that, these puzzles are embedded in worlds the players can move freely around in. Noteworthy in these games is also the perception of the color green [24]; as an inspirational tool we designed a mood board to get a sense of how players felt about the green color (see Fig. 2 below).

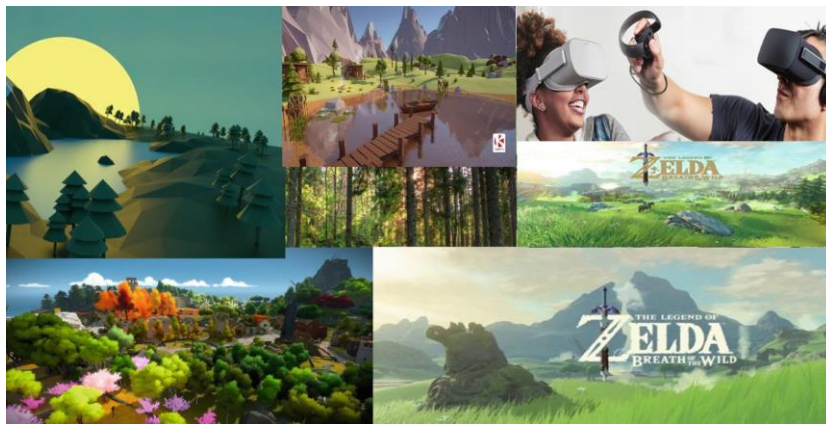


Fig. 2. Mood board to investigate the players' emotions and responses.

The result of our investigation of the mood board showed that players correlated the green color with relaxation, summertime, holidays, and spending happy days with friends. Those results convinced us to emphasize the green color in the design of *The Island of Play*, since those feelings were exactly the responses we were looking for. Finally, we hoped that such design would create an embracing space where children could interact, socialize, fool around, and have fun.

A top view of *The Island of Play* (see Fig. 3 below) showcases not only the entire island, but also the four main areas of embedded activities; a beach volley site, a labyrinth, woods, and the area where players arrive and depart from the island (start camp and helicopter pickup).

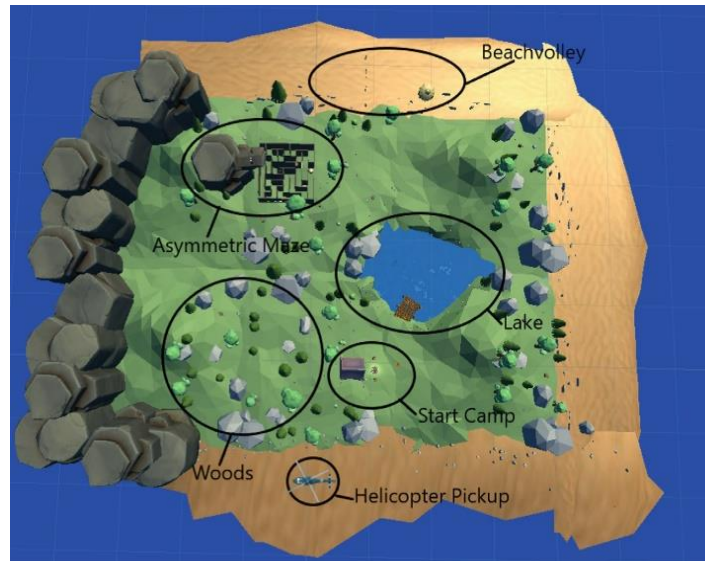


Fig. 3. An overview of the entire area of *The Island of Play*.

Our preliminary play tests demonstrated that when entering the application for the first time players looked around to familiarize themselves with the site followed by curiously moving about while figuring out how to interact with the surroundings. A general finding of ours was that players experimented with the surroundings to determine if and how objects responded. Simultaneously, the children were enthusiastic about navigating the spatial layout of the island.

On *The Island of Play* children locate activities based on the assumption that interactional objects create activity and become playful [15, 18, 48] if they abide to explicit rules and goals. For instance, one such activity has to do with finding and plucking cartoonish looking red and white mushrooms. This activity invites self-organized play scenarios, as our observations attested. Children plucked the mushrooms and in an elevated mood began to either playfully throw them up into the air or into the water; or they would teasingly throw them at each other while simultaneously jumping and crouching to avoid being hit by the incoming mushrooms.

Another example of a self-organized play activity happened around the game of beach volley. Either the children approached this in-game activity formally; or they utilized the game of volleyball in a multitude of unforeseen ways. The latter involved throwing the ball high into the air; balancing the ball on their fingertips; and bouncing the ball from one hand to the other and back again. As part of the island's design there is a radio placed on a table next to the beach volleyball. Here, children can listen to different kinds of music while playing around or spontaneously take up dancing on the beach, which, by the way, wasn't constrained by the lack of a bodily presentation: weaving hands and a moving head sufficed as 'dance'.

The labyrinth in the center of the island is filled with intriguing interactive obstacles. However, the children must work together to successfully navigate the maze. Thus, we introduced several techniques of interaction to facilitate cooperation; equipping and embedding twist and turns within

the labyrinth as well as adding puzzle elements on top of the navigational challenge. The goal of the labyrinth, of course, is to safely navigate from the entrance to the exit, but in order to do so the child situated inside the labyrinth depends on assistance from the other child, which have to walk to the top of a hilltop next to the maze. From this vantage point the child can assist and guide her fellow playmate. The maze is therefore designed asymmetrically. One child must be inside the labyrinth while the other child assists in solving the challenging tasks. The intention behind this design was teamwork; to spark social interactions and a playful atmosphere between players.

Furthermore, the development of *The Island of Play* was intended to follow a scrum-based framework [46, 54] coupled with an agile iterative approach [25], user-testing [30], a continuous attention to design matters. However, the development process was – as noted above – disrupted by the arrival of covid-19. This obviously meant that playtesting in the hospital setting was out of the question.

3 Understanding Play

Since the development of *The Island of Play* focuses on play and game elements to promote playful, purpose-driven social interactions it is necessary to come to grip with what is meant by ‘play’ and ‘games’.

In ludology, the (formal) study of computer games, a multitude of definitions and explanations of ‘play’ and ‘gameplay’ prevail often resulting in a confusing and rather non-consensual conceptualization [18, 21, 53]. However, within the scope of the present case, play is regarded as a free and voluntary activity that strengthens social relations and personal empowerment [19]. This understanding of play is inspired by Huizinga’s [15] definition of play as “a free activity standing quite consciously outside “ordinary” life as being “not serious”, but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and so no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means” (p. 13 [15]).

In *The Island of Play* players engage in voluntary activities, which Huizinga most probably would regard as ‘not serious’ and without any ‘material interest’, such as plucking funny looking mushrooms and throwing them either around or after each other. Not only can players take on different roles and act accordingly whether outsiders view them as secretive or not; they can also involve themselves and engross their activities in situated social happenings: ephemeral social groupings such as oscillating between interacting socially or exploring the island while others are engaged in other activities.

Nonetheless, in contrast to play, games are usually considered goal dependent, relying on challenges, establishing clear rules together with indisputable procedures, concise feedback, and

variable and quantifiable outcomes, which secure uneven results. This means that games should end differently each time they are played and with varied outcomes [10, 12, 22, 36].

Surely, play possesses the ability to evolve into games, which by some researchers' standards [57] insert games as a subset to play or as a natural evolutionary continuation of an initial formation of play. The tropical island of *The Island of Play* inspires formations of play outlined by Huizinga and to instill a playful attitude [43] in the players together with an opportunity for play to evolve into gameful [20] activities; the latter would happen through stricter and more rule driven activities [4], such as the beach volley and labyrinth activities both of which can be engaged with either playfully or as part of a structured, goal-oriented gameplay. We designed *The Island of Play* with this flexible dynamic in mind. The overall aim was to uplift essential play and game design elements and bring them front and center.

Our play-centric approach was inspired by Tracy Fullerton [12], Jesse Schell [45], and Robert [59] who all highlight the divide between formal and dramatic game design elements. This distinction is far from trivial. The formal game design elements place emphasis on players' patterns of interaction, the objectives of the game, the rules, and procedures of the game together with the resources of the system, the emerging challenges, and unpredictable outcomes. In light of formal game design elements our design took into account not only the number of players, but also their pattern of interaction. We aimed to create cooperative patterns of interaction to promote social interactions between players. This feature is especially apparent in the asymmetrical objectives build into the labyrinth at the center of the island. Asymmetrical objectives present players with different goals and mechanics [4, 47] defined as methods for interacting with the game state. These objectives and mechanics define what players aim toward within the rules or frame of the labyrinth. In *The Island of Play* rules act as a framework around the game, while the procedures dictate the agency of playing the game: who does what and when to achieve the objective(s) of the game. For instance, are players allowed turn taking? Turn taking between two cooperating players introduces social interaction and creates a sense of purpose, especially if the activity centers on realizing a common goal. Our play-testers underscored this assumption, i.e., they exhibited a heightened social interaction. Afterwards they said that the lack of stress together with turn taking greatly increased social interactions.

The dramatic elements, on the other hand, are concerned with the fictional fantasy and story of the game as they provide a context for gameplay [8, 9]. Not all games are mounted on narrative in their designs. This is evident in games such as Tetris [63], while other games like *The Stanley Parable* [65] build their entire gameplay experience [16] around characters, plots, and story [59].

Within the confines of this design case, we focused on the game design elements that assisted players in reaching goals as well as the play elements and structures of interaction. Of particular interest was the combination of play and game elements that fused into an experience that

strengthened and enriched the players' social bonds – such as open-ended mushroom plucking and the asymmetrical design of the labyrinth.

4 Reflections on the Design of the Player's Character in *The Island of Play*

This section pivots on reflections on the design of playfulness regarding the player's character (avatar). In particular, we will look into the emotional connection between the player and her representation inside *The Island of Play* and further discuss how this representation fuels the commitment to play within the game world activities. Our findings showed that the bonds between avatar and player was both necessitated by and expressed through the players' commitment to playful activities. When players took on new identities, they assigned values and a certain intentionality to their avatars. According to game design theory, this happens regardless of whether the player becomes a hero in a fairytale or plays the role of a volleyball player. In the case of *The Island of Play*, the player was represented inside the virtual playground as an abstract shape and not as a well-crafted character. We equipped the player with an avatar in the shape of a three-dimensional cube together with two 'Stickmen'-like, 'free flowing' and moving hands ready for interaction (see Fig. 4 below).



Fig. 4. The character as the other player perceives it.
The character is shaped by a 3D cube with free floating hands.

A few considerations regarding the shape of the avatar deserves to be mentioned. Character shapes are not as value free as one would assume. Most avatars are based on fundamental geometrical shapes: circle, square, and triangle [51]. Each shape encloses a range of symbolic values. The circle points toward innocence, youth, energy, movement, positivity, freedom, and relaxation. The square, on the other hand, makes symbolic reference to maturity, balance, stubbornness, strength, rest, restraint, rationality, conventionalism, and calmness. Lastly, the

triangle is associated with aggression, force, instability, pain, sorrow, and tension. Of course, the primary shapes together with their identified symbolic values and sensations allow for a multitude of combinations and compositions expanding from the characters' shapes, their poses, the objects of the game, the lines of movement within the game environment, as well as the formation and contours of the surrounding milieu including the possible pathways laid out for the character. In line with this thinking *The Island of Play*-cube represents balance, stability, strength, and rationality. In the early phases of the design process the cube was thought of as a placeholder for later re-design. Luckily, we observed how the play testers took to and relished the raw cubic shape. The raw cubic shape allowed the play testers to inscribe and project their own fantasy onto the avatar. In other words, we thought the play testers would dislike the cube, but the opposite happened. The cube gave room to assign imaginary roles to the play activities, which falls well in line with theories of play and make-believe in the field of ludology [15, 18, 49]. Conclusively, the game designers decided to stick with the cube. In all fairness, this wasn't the only reason behind our decision: our project suffered, as is the case with so many others, of lack of development time, which in turn constituted a less inspiring second reason for leaving the character in its present cubic shape. In future iterations, however, taking the design theory and target group into account, an avatar of circular shape would most likely be preferable, especially since the circle easily accentuates youth, energy, movement, freedom, and perhaps most importantly, playfulness.

We accommodated the cube with free floating hands. The idea behind this design choice was that free floating hands would support non-verbal communication in the form of gestures: weaving, pointing, saluting, and so forth. From a practical perspective, the free-floating hands manifested the primary passageway of interaction with the objects of the virtual playground. The hands are maneuvered by physical controllers, which are translated into hand gestures inside the play world. The play testers seemed to relate to the hands as they function in real life, i.e., as 'tools' to grab, move, lift, throw, and catch objects inside the play world.

Beyond these design choices other unexplored options are available. In particular, that character designs can be integrated into schematic story arcs such as the Hero's Journey [7], in such a way that players could act out and play the characters of a multitude of different known stories. Other design possibilities could be 3D-scans of the actual real-world player, which would bridge and remix virtual reality representations with the player's appearance in actual reality. However, interpolating the player's real-world presence onto the virtual representation could prove to be an unsound strategy. Especially since, from a theoretical viewpoint at least, such a strategy could conflict with the players' behavior of projecting their own fantasies onto the shape of an avatar. In conclusion, it remains an open question whether it would work to 3D-scan the players to create avatars; perhaps it would strengthen the social bond between players; or perhaps it would undermine their playful behavior. However, as is always the case with the development of

interesting artefacts, playtests are required to determine whether such reservations are right or wrong.

5 Reflections on the Design of Game Objects and Playful Interactions in *The Island of Play*

The design of engaging gameplay [8, 9] is far from easy: it requires insight, careful calibration, and meticulous balancing [10] with a firm focus on the players' experience during play [16, 58]. Research shows that players' exertion of what they feel during gameplay can be translated into exciting game mechanics [4, 47, 59]. Game mechanics are interesting since they constitute the ways players interact with the game state; walking, running, crouching, jumping, swimming, swinging, shooting etc. Game mechanics are the 'verbs' of the game: all the stuff the player can do. Game mechanics should not be confused with game feel, which is defined as "real-time control of virtual objects in a simulated space, with interactions emphasized by polish" [55 p. 6]. Game feel is contrary to game mechanics, as the former evolves around player sensations derived from the interactions with a responsive game system [58]. However, both game mechanics and game feel direct design intentions: on the one hand they outline the formal ways of interacting with a game state (game mechanics), and on the other hand they demonstrate how such interactions feel (from a player-centric perspective). In *The Island of Play*, game mechanics and game feel both primed and guided our design decisions. We focused on creating game objects that allowed for a wide range of uses – such as plucking the aforementioned mushrooms.

A common design complication is the tension between freedom and control. This involves the tension between, on the one hand, the player's ability to roam around freely while exploring the surroundings and interacting with the objects in the surroundings, or, on the other hand, to feel boxed in; to be inserted into a rigid structure without ample space for self-directed maneuvering [43]. Our design approach valued the players' self-directed and free movement as opposed to a task-laden structure that places emphasis on a structure which dictates 'do x' before you can 'do y' and before 'z' happens, and so on. This design choice, we hoped, would inspire intriguing play scenarios since the players were left to figure out how to move about and use the available objects. The approach turned out to be right: players did move about freely and felt inspired to explore in their own pace and by their own volition.

However, beyond the complicated tension between freedom and control, we faced other design challenges, first and foremost how to design proper patterns for playful interactions with the game objects. This design challenge hinges on the creation of an environment rich with objects, we discovered. It is important to note, that game objects should be understood by their properties, behaviors, and relationships, as defined by Fullerton [12]. For instance, "Mario's properties, behaviors, and relationships in the Super Mario-series [62] are centered around his ability to run, jump [game mechanics], and collect coins, mushrooms, nuts, and flowers (game objects), which in

turn provide the player with an extra life, make Mario glide through the air, or shoot fireballs” [21 p. 5]. All these properties available to the player affect how she chooses to traverse the obstacles of the levels. Hence, players’ interactions with objects within the frame of gameplay and within the game world should feel meaningful, which is to say, they should be both discernable and integrated. “Discernable actions mean that the result of a game action is communicated to the player in a perceivable way [while the other] component of meaningful play requires that the relationship between action and outcome is integrated into the larger context of the game” [43, p. 34–35]. The quote above signals that interactions with objects should be clearly communicated while simultaneously affecting the game state now and later. Chess is a prime example of this case: the player moves a chess piece, which is discernable, and the action creates meaning here and now; but the move also dictates meaning later on: it is a move that directly influences the future game state.

Another design challenge concerns the pattern of interaction that arises from how players choose to interact with each other. Here, designers should explore and consider the following questions: Are players equipped with the same mechanics or do they interact with the game state through different means (different mechanics)? Also, how do these interaction mechanics tie into the social dynamics of players? How can the players interact with each other? Does communication consist in using gestures, chat messaging, or perhaps voice commands? Or is the interaction rather mediated by game objects where one player picks up a ball and throws it to the other player who in turn could catch the ball and/or return it to the first player? Questions such as these uncover the spatial game environment instrumental in developing *The Island of Play*. We populated the island with game objects which we hoped would create playful and social interactions. In other words, players should be able to interact with the game object – and then things would happen. Two play testers demonstrated this case when they explored the intricacies of the objects present on the island. In Fig. 5 below, the players engaged with the beach volley opportunity by throwing the ball to each other, which in this case ended up in the water: presenting a problem to solve together.

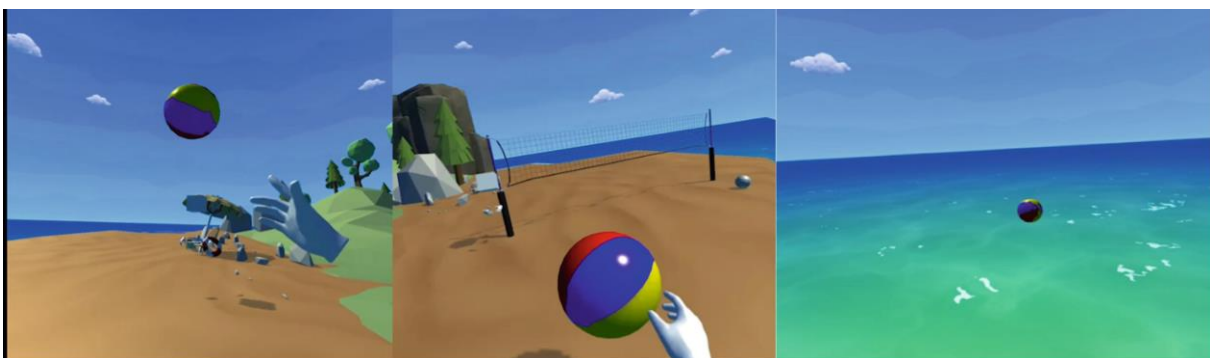


Fig. 5. The two players throw a beach ball to each before it ends up in the water. Luckily, the players can easily fetch the ball. If they choose not to fetch the ball it will drift to shore.

Yet another design consideration behind the ambition of enriching the *The Island of Play* with plentiful objects to interact with was the notion of the empowered agent [13]. This should be understood within the context of an affordance network: the digital playground presents game objects to be acted on with socially agreed upon trajectories. These considerations of game design rest on the notion that players shouldn't be viewed as game consumers, but as producers of play experiences. We observed that players attuned themselves to the environment of *The Island of Play*, in that they developed *effectivity sets*, i.e., means for interacting with the surroundings and each other, thereby activating and enhancing their *life-worlds* [1]. The non-directed game objects did what we hoped for: they created self-directed play, which oscillated between individual enquiries and social interaction. In conclusion of this section, we would have liked to populate the island with even greater numbers of interesting game objects, since they seem to drive a host of inspiring social play scenarios that enhance the bond between the players. The following section will tune in and focus more on the social experience of *The Island of Play*.

6 Reflections on the Design of Social Experiences in *The Island of Play*

For most children and teens gaming is a social activity and a major component in their social life [28]. Teens play games in a variety of ways and for numerous reasons, which include inviting others to join in game sessions in person, online (through Discord or by phone or sometimes both depending on connectivity), and of course by themselves. Studies have found that three-quarters of teens play games with others some of the time [28]. Close to half of the teens who play online games do so with people they know in their offline lives. Keeping in touch with friends and maintaining friendships are done by social media and through multiplayer games. In *The Island of Play* the players can socialize with each other in a playful manner using the present game objects: the beach ball, the music device, and the mushrooms. In multiplayer games players often can decide from various types of user interaction patterns: player vs player; cooperative play; team competition, and multiple individual players versus game [12]. In *The Island of Play* players can use voice-chat, gestures, and game objects to communicate.

However, designing social experiences in computer games and virtual reality hinges on several things. For one, multiplayer play or game worlds must invite social interactions: the possibility for establishing *and* maintaining social relationships. When players engage in multiplayer games, they find themselves participating in and expanding each other's "life-worlds". In other words, multiplayer games possess the ability to influence each other's experience of play. This seemingly innocent insight is important since it calls for thinking about how, why, and when players influence each other's experience of play.

In *The Island of Play*, we tried to incorporate cooperative play activities together with player versus player interaction patterns (voice-chat, gestures, interacting with game objects). When players fooled around with the pluckable mushrooms or joyously threw the volleyball into the air or

out to sea, we observed, they found themselves engaged in inclusive play. The opposite was true, we discovered, when the players engaged in a formal game (match) of beach volley, in which case the players participated in a player versus player game-like structure. Consequently, the players became more competitive and less forgiving of each other. It deserves to be mentioned that, in the game of beach volley, the players had the opportunity to either follow preestablished rules or develop their own set of rules, values, and countable outcomes [23, 41], which they did on more than one occasion. Still, neither the play nor the game-like activities were fixed and predetermined; they existed only as options and not as points or places that had to be conquered to progress further into the game world.

However, when players engaged with the labyrinth at the center of the island they had to asymmetrically work together to explore and unearth the hidden secrets of the labyrinth. Thus, when players explored the labyrinth they cooperated against the game system, so to speak. And they did so by different means: players occupied different roles and used diverging methods for interacting with the game state. I.e., player one walked through the maze in an effort to discover the needed key codes, while player two, from the mountain top afar, oversaw the labyrinth and punched in the key codes received by voice-chat. This meant that player two, in the receiving end, acted upon the verbal inputs from player one.

This asymmetric pattern of interaction design instantiated the desired form of cooperative play. In other words, if players desired to combat the labyrinth they could do so, but they would have to work with the other player; they would have to communicate with each other to complete the task (see Fig. 6).



Fig. 6. To the left a screenshot of the labyrinth from the perspective of player two. The picture to the right is viewed from the perspective of player one.

The interaction patterns of *The Island of Play* hold potential to be developed even further by including more players and/or more diverse challenges and obstacles with even more player roles. However, the play test revealed that longer lasting activities were the self-directed play scenarios

driven by the objects of *The Playful Island*. Thus, further development should focus on developing a wider range of diverse options of playful interactions with objects that inspire solitary *and* cooperative play.

7 Reflections on Using the Magic Circle for Design in *The Island of Play*

We set out with an idea of play derived from Huizinga [14]. His explanation of how play takes place inside what he coined ‘the magic circle’ [43] seemed to resonate well not only with our understanding of play, but also with our design challenge of making a virtual playground within which children would play and socialize. However, Huizinga’s concept of the magic circle deserves an introduction. Broadly speaking, ‘the magic circle’ circumferences and outlines the conceptual, mental, and physical experiences as well as the boundaries of a play space [38], which in our case is the conceptual and digital geography of *The Island of Play*.

The conceptual framework of the magic circle highlights how two different places (spaces or states) are separated by a clear boundary [14, 17]. The segregation distinguishes an ‘inside’ of a game or play activity from an ‘outside’ of the selfsame game or play activity. This distinction is attributed to Huizinga’s characterization of play as an activity separated from ordinary life.

In computer games as well as in virtual reality game worlds, the physical boundaries between the game world and real world are obvious and easy to distinguish. However, the boundaries quickly blur when the experience of taking part in a make-believe play scenario meshes with the physical surroundings. Here, the experience of make-believe play can conjure up magical scenarios where players find themselves immersed in serious play activities in otherwise ordinary surroundings. Thus, make-believe play becomes quite fantastic; especially when we think of our ability to create and enter vivid scenarios driven entirely by a mental simulation. Here, we should remember that we have no problem of convincingly imagining something while simultaneously knowing that the imagery isn’t real at all. We move in and out of such scenarios with ease.

Nonetheless, the ambition of *The Island of Play* was to inspire make-believe play inside a virtual playground advanced by compelling imagery and interesting objects to interact with. To achieve this lofty ambition, *The Island of Play* is populated, as already mentioned, with several playful objects designed to animate flexible, negotiable, and ‘open ended’ activities as opposed to traditional game-like structures, which focus on goals, challenges, feedback, and quantifiable outcomes. But accentuating playful activities within *The Island of Play* is not the same as stating that game-like activities, such as the labyrinth, do not hold a place there as well. Thus, both playful interactions and game-like activities may populate the magic circle; our play testers easily shifted between modes of play and modes of gaming.

Moreover, the virtual playground could easily integrate more game-like features similar to those found in e.g. *Minecraft* [60]. We could introduce building options as well as a mechanic for killing hostile zombies, or perhaps running deep into dangerous dungeons, as in *Minecraft Dungeons* [61].

In short, a future design option could be to present players with a common goal, introduce several challenges, and further implement a variety of upgradable options to choose from. All of this, however, should be designed in such a way that players would have to work together. We should never abandon the socializing aspects of the play world, as it speaks directly into the vision of the game: to promote and sustain friendship.

Traditionally, game goals provide players with a sense of purpose, while challenges hinder the progress of reaching said goal. Upgradable options underscore progression and merge both intrinsic and extrinsic motivation [42]. When limitations are added to the mix, they can inspire players' perseverance and the evolution of creative strategies for reaching a particular goal [36]. Another design option could be to integrate quest-like structures like the ones found in the mobile game *Animal crossing: Pocket Camp* [64]. Here, players engage in a social simulation where they customize their avatars and inhabit their living spaces; furnish camp sites with utilities not forgetting the option of gathering tradeable materials such as cotton and wood. All in all, a target group identical to that of *The Island of Play*.

When we look at the simulated 'physical' boundaries of the magic circle of *The Island of Play* it is constituted by the surrounding ocean of the island. The Island itself figures as a mixture between a playground and a deserted tropical island. The overall ambience of the Island is intended to elicit a vacation-like sensation, a promising, pleasant, and cozy experiences. Indeed, the players shouldn't expect monster encounters. Instead, *The Island of Play* radiates safeness, tranquility, and a playful atmosphere. Birds are singing, the sea is calm, and the world is at peace (see Fig. 7).

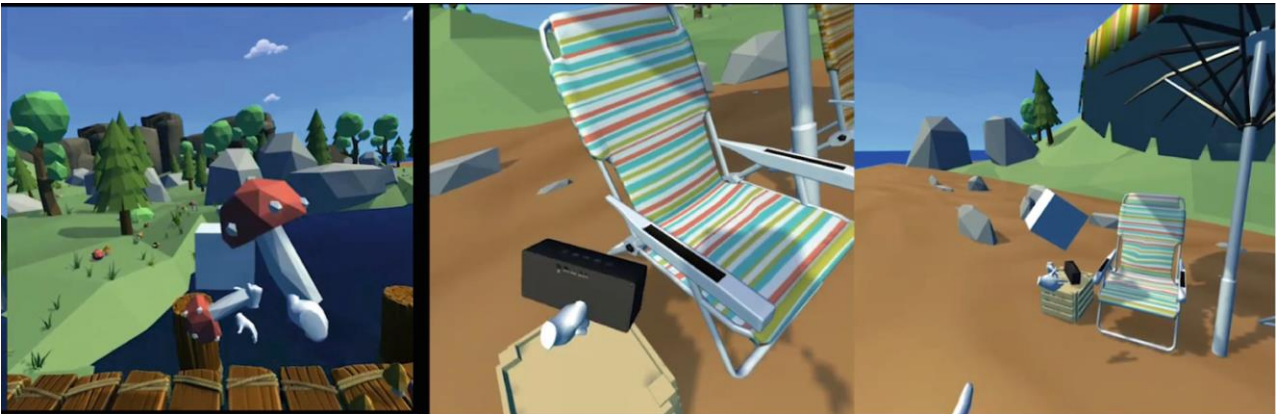


Fig. 7. The screenshot to the left show players having fun picking mushrooms, while the beach scenario on the screenshot to the right depicts the players' search for music through the airwaves of the music box. The music quickly fades when players leave the area.

*Considering the Players' Sensation of Purpose and Development of Skills
in The Island of Play*

When we designed and play tested *The Island of Play* we gave attention to the possible goals of the activities of play. Goals in games, as already noted, present players with targets to strive for, which instils a sense of purpose. Furthermore, goals provide players with trajectories toward accomplishments within the confines of the rules of the game. Moreover, goals and challenges grant players the time and place to practice interactions and sharpen their skills [21] – all to reach the end goal of the game. Additionally, the goals of a game activity tend to set the tone and atmosphere of the entire game. All in all, goals are important; they establish a complex web of aspirations, purposes, and possibilities for navigating the game space.

We wanted to tap into those dynamics, and especially emphasize the sensation of purpose. We discovered to our surprise that play scenarios where the players interacted with objects also instantiated a sense of purpose. For instance, when players discovered how to pick mushrooms and afterwards learned how to throw them, they experienced purpose while simultaneously gaining insight into the operations of the game system. Also, when players embraced the teleport ability – yes, we included such a device to maneuver the island – they immediately felt purposeful, as the device was instrumental in navigating the landscape of the game world. Later, when players figured out how to collaboratively manage the different player roles to successfully penetrate the labyrinth, they again felt a sense of purpose. The players got this sensation when they communicated and assisted each other in a mutual effort to unveil the secret digits and hidden keys inside the labyrinth. Especially the labyrinth provided the players with a shared goal and therefore a shared purpose. Important, however, the rules of operating and navigating the labyrinth are fixed and unchangeable. Thus, the rules are not negotiable. But players are, of course, not prevented from inventing their own rules ('house rules'). Playtesting revealed how players placed their own inventions on top of the existing parameters. If, for instance, some players found traversing the labyrinth amusing while listening to the music box while carrying mushrooms. Such behavior has no bearing on solving the mysteries of the labyrinth. Nonetheless, we went to great length to make sure that the parameters for and the rules themselves attuned or aligned with the players' opportunity for interaction and progressing their skill levels.

In *The Island of Play* we also ensured that players were presented with ample opportunities to enthrall playful activities – collecting and tossing objects around, as previously mentioned – while simultaneously training and honing the players' abilities for teleporting, gripping, and letting go of collected objects, and, finally, accustoming themselves with the physics of the world. Certifying that players learn in incremental steps – whereby they gradually expand their knowledge of the game space [20] – constitutes a vital component in the design of an immersive [6] experience. Additionally, in-game goals also prepare players for future challenges; they must plan, negotiate directions, and come to terms with their choices. The labyrinth sets the stage for applying the

learned abilities, so that players must work together toward a common goal, which in turn inspires social interaction between the players.

In carefully crafted games, players gradually learn new abilities and mechanics in clear successive steps. However, these games must also present the players with opportunities to practice and sharpen their skills by engrossing them in challenges they need to accomplish if they want to continue. Normally, players regard their skills first and foremost as strategies for accomplishing desired goals and only secondarily as a set of discrete and discernable skills [13]. In *the Playful Island*, the playful activities were some of the most successful ones of the entire game. In general terms, our observations prompted a call to redesign and rethink the exact overall number of interactable objects, as they both encompass and promote play, and thus highlighting a key takeaway of this project: that play objects should be favored over game-like scenarios.

Reflections on Designing The Island of Play: A Summary

In essence, our reflections on the design case of *The Island of Play* have focused on five design considerations. Together they encompass a matrix that focus not only on the design of the game itself but also on the player's experience of the interaction with the game. These reflections engross both a game-centric and a play-centric approach to design, which spring from a sometimes diffuse and elusive understanding of what play is, as dealt with in the above. Nevertheless, the five considerations of design can be summed up as follows: 1) Reflections on the design of the player's character. 2) Thinking about the playfulness of the game objects. 3) Questions of how to accelerate the social interaction between the players. 4) Reflecting upon the magic circle. And, finally, 5) diving into the player's sense of purpose of the game.

8 Conclusion

The description of our design case, *The Island of Play*, stressed several hands-on design considerations in the design of a playful multiuser virtual reality playground: *The Island of Play*. These experiences and considerations constitute the bulk of this article. Reflections sprung from the in-house development of a multiplayer Virtual Reality application, which we have dubbed *The Island of Play*. As described and discussed above, the ambitions behind *The Island of Play* was to create a virtual play space where long term hospitalized children could socialize and play with their friends from school and home. We anticipated, from our research into play, that playful activities could be created from open-ended interactions as well as using game-like structured designs. We hope and think our considerations of design are applicable to a host of design cases, which focus on virtual play worlds entailing playful interactions – whether driven by the ambition to develop virtual reality sites for playful social interactions; or whether they are novel spaces in the ever-expanding field of Serious Games.

References

1. Barab, S.A., Roth, W.-M.: Curriculum-based ecosystems: supporting knowing from an ecological perspective. *Educ. Res.* 35(5), 3–13 (2006)
2. Boling, E.: The need for design cases: disseminating design knowledge. *Int. J. Des. Learn.* 1(1), 1–8 (2010). <http://scholarworks.iu.edu/journals/index.php/ijdl/index>
3. Brown, T.: Design Thinking. *Harvard Business Review*, pp. 1–10 (2010)
4. Burgun, K.: *Clockwork Game Design*, 1st edn. Focal Press, Burlington, MA (2015)
5. Calleja, G.: *In-Game – From Immersion to Incorporation*. The MIT Press Cambridge, Massachusetts, USA (2011)
6. Calleja, G.: Revising immersion: a conceptual model for the analysis of digital game involvement. In: *Situated Play, Proceedings of DiGRA*. <http://www.digra.org/digital-library/publications/revising-immersion-a-conceptual-model-forthe-analysis-of-digital-game-involvement/> (2007). Retrieved 10 Nov 2020
7. Campbell, J.: *The Hero with a Thousand Faces*. New World Library, California, USA (2008)
8. Costikyan, G.: I have no words & i must design: toward a critical vocabulary for games. In: *Proceedings of Computer Games and Digital Conference*, Tampere University Press. <http://www.digra.org/digital-library/publications/i-have-no-wordsi-must-design-toward-a-critical-vocabulary-for-games/> (2002)
9. Larsen, L.J., Walther, B.K.: The ontology of gameplay: toward a new theory. *Games Cult.* 15(6), 609–631 (2020). <https://doi.org/10.1177/1555412019825929>
10. Elias, G.S., Garfield, R., Gutschera, K.R.: *Characteristics of Games*. MIT Press, Cambridge (2012)
11. Frasca, G.: Immersion, outmersion & critical thinking. <http://www.dream.dk/uploads/files/Gonzalo%20Frasca.pdf> (2008)
12. Fullerton, T.: *Game Design Workshop*, 3rd edn. Elsevier, Morgan Kaufmann Publishers (2014)
13. Gee, J.P.: Learning by design: good video games as learning machines. *E-Learn. Dig. Media* 2(1), 5–16 (2005)
14. Howard, C.D.: Writing and rewriting the instructional design case: a view from two sides. *Int. J. Des. Learn.* 2(1), 40–55 (2011). <http://scholarworks.iu.edu/journals/index.php/ijdl/index>
15. Huizinga, J.: *Homo Ludens—A Study of the Play-element in Culture*. Martino Publishing, Mansfield Centre (2014)
16. Isbister, K.: *How Games Move us—Emotion by Design*. Playful Thinking Series MIT Press, Cambridge and London, England (2017)
17. Larsen, L.J., Majgaard, G.: The concept of the magic circle and the Pokémon GO phenomenon. In: Geroimenko, V. (ed.) *Augmented Reality Games I*, pp. 33–50. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-15616-9_3

18. Larsen, L.J.: Play and space—towards a formal definition of play. *Int. J. Play* 4(2), 175–189 (2015). <https://doi.org/10.1080/21594937.2015.1060567>
19. Larsen, L.J., Majgaard, G.: Expanding the game design space: teaching computer game design in higher education. *Designs Learn.* 8(1), 13–22 (2016)
20. Larsen, L.J.: Play and gameful movies: the ludification of modern cinema. *Games Cult.* 14(5), 455–477 (2019). <https://doi.org/10.1177/1555412017700601>
21. Larsen, L.J.: The play of champions: toward a theory of skill in eSpor. *Sport Ethics Philos.* 16(1), 130–152 (2020). <https://doi.org/10.1080/17511321.2020.1827453>
22. Juul, J.: The game, the player, the world: looking for a heart of gameness. In: Copier, M., Raessens, J. (eds.) *Level Up: Digital Games Research Conference Proceedings*, pp. 30–45. Utrecht University, Utrecht (retrieved 10–04–2018) <http://www.jesperjuul.net/text/gameplayerworld/> (2003)
23. Juul, J.: *Half-Real—Video Games Between Real Rules and Fictional Worlds*. The MIT Press, Cambridge, Massachusetts, London, England (2005)
24. Kaya, N., Epps, H.H.: Relationship between color and emotion: a study of college students. *Coll. Stud. J.* 38(3), 396–405 (2004)
25. Keith, C.: Scrum rising—Agile development could save your studio. Retrieved 21 Nov 2020, from <http://www.clintonkeith.com/resources/ScrumRising.pdf> (2007)
26. Kimbell, L.: Rethinking design thinking: part I. *Des. Cult.* 3(3), 285–306 (2011)
27. Kimbell, L.: Rethinking design thinking: part II. *Des. Cult.* 4(2), 129–148 (2012)
28. Lenhart, A., et al.: Teens’ gaming experiences are diverse and include significant social interaction and civic engagement. *Pew internet & American life project 1615 l st., nw– suite 700, Washington, D.C. 20036* (2008)
29. Li, W.H., Chung, J.O., Ho, E.K.: The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer. *J. Clin. Nurs.* 20(15–16), 2135–2143 (2011)
30. Macklin, C., Sharp, J.: *Games, Design and Play: A Detailed Approach to Iterative Game Design*. Addison-Wesley, US (2016)
31. Majgaard, G., Weitze, C.: Virtual experiential learning, learning design and interaction in extended reality simulations. In: *Proceedings of the European Conference on Games-based Learning* (2020). <https://doi.org/10.34190/GBL.20.010>
32. Lyk, P.B., Majgaard, G., Dietrich, T., Stock, C.: Co-Designing an immersive and interactive alcohol resistance training tool using 360-degree video. In: *Proceedings of the 13th European Conference on Game Based Learning, ECGBL 2019*. Academic Conferences and Publishing International, pp. 450–458. (2019) <https://doi.org/10.34190/GBL19.081>
33. Majgaard, G.: Quick and dirty group testing of mobile app for educators teaching digital literacy and production. In: *Proceedings of the 15th European Conference on Game Based Learning*

- ECGBL 2021. Academic Conferences and Publishing International, pp. 509–515. (2021)
<https://doi.org/10.34190/GBL.21.048>
34. Majaard, G.: The playful and reflective game designer. *Electron. J. E-Learn.* 12(3), 271–280 (2014)
 35. Malm, T., et al.: *Jeg er ikke min sygdom, ed. I am not my illness.* Børnerådet (2017)
 36. McGonigal, J.: *Reality is broken.* Jonathan Cape, London, England (2011)
 37. McMahan, A.: *Immersion, Engagement, and Presence: A Method for Analyzing 3-D Video Games in The Video Game Theory Reader.* Routledge, UK (2003)
 38. Montola, M., Stenros, J., Waern, A.: *Pervasive Games: Theory and Design.* CRC Press (2009).
<https://doi.org/10.1201/9780080889795>
 39. Murray, J.: *Hamlet on the Holodeck.* MIT Press, Cambridge (1997)
 40. Natalie, A., Williams, A.B.: *Importance of Play for Young Children Facing Illness and Hospitalization: Rationale, Opportunities and a Case Study Illustration.* *Early Child Development and Care.* Taylor and Francis, UK (2019)
 41. Rogers, S.: *Level Up—The Guide to Great Video Game Design, 2nd edn.* Wiley, UK (2014)
 42. Ryan, R.M., Deci, E.L.: *Intrinsic and extrinsic motivations: classic definitions and new directions.* *Contemp. Educ. Psychol.* 25(1), 54–67 (2000)
 43. Salen, K., Zimmerman, E.: *Rules of Play—Game Design Fundamentals.* The MIT Press, Cambridge, Massachusetts, London, England (2004)
 44. Salmond, M.: *Video Game Level Design.* Bloomsbury, London, New York, Oxford, New Delhi, Sydney (2021)
 45. Schell, J.: *The Art of Game Design: A Book of Lenses, 2nd edn.* CRC Press, Boca Raton, FL (2008)
 46. Schwaber, K.: *Agile Project Management with Scrum.* Microsoft Press A Division of Microsoft Corporation, US (2004)
 47. Sicart, M.: *Defining game mechanics.* *Game Studies*, 8. <http://gamestudies.org/0802/articles/sicart> (2008)
 48. Sicart, M.: *Play Matters.* The MIT Press, Cambridge, Massachusetts, London, England (2014)
 49. Dorothy, G., Singer, J.L.: *Reflections on pretend play, imagination, and child development.* *Interview Am. J. Play* 6(1), 1–14 (2013). <https://www.journalofplay.org/sites/www.journalofplay.org/files/pdf-articles/6-1-interview-relections-on-pretend-play.pdf>
 50. Smith, K.M.: *Producing the rigorous design case.* *Int. J. Des. Learn.* 1(1), 9–20 (2010).
<http://scholarworks.iu.edu/journals/index.php/ijdl/index>
 51. Solarski, C.: *Interactive Stories and Video Game Art—A Storytelling Framework for Game Design.* CRC Press, Taylor and Francis Group, London and New York (2017)
 52. Squire, K.: *Video games in education.* *Comput. Entertain.* 2(1), 49–62 (2005)

53. Stenros, J.: The game definition game: a review. *Games and Cult.* 12(6), 499–520 (2017).
<https://doi.org/10.1177/1555412016655679>
54. Sutherland, J.: *Scrum Handbook*. Retrieved 23 Nov 2020, from <http://www.scrummaster.dk/lib/AgileLeanLibrary/People/JeffSutherland/scrumhandbook.pdf> (2010)
55. Swink, S.: *Game Feel: A Designer's Guide to Visual Sensation*. CRC Press, Taylor & Francis Group, Boca Raton, London, New York (2009)
56. Tonkinwise, C.: Design studies—what is it good for? *Des. Cult.* 6(1), 5–43 (2014)
57. Walther, B.K.: Playing and gaming – reflections and classifications. *Game Studies the Int.J. Comput. Game Cult.* 3(1) (2003). Available at: <http://www.gamestudies.org/0301/walther/>
58. Walther, B.K., Larsen, L.J.: Bicycle kicks and camp sites: towards a phenomenological theory of game feel with special attention towards 'rhythm.' *Convergence: The Int. J. Res. into New Media Technol.* 26(5–6), 1248–1268 (2020). <https://doi.org/10.1177/1354856519885033>
59. Zubek, R.: *Elements of Game Design*. The MIT Press, Massachusetts, London, England (2020)

Ludography

60. *Minecraft*. Mojang Studios (2011)
61. *Minecraft Dungeons*. Mojang Studios (2020)
62. *Super Mario Series*. Nintendo (1985–2015)
63. *Tetris*. Infogrames (1984)
64. *The Legend of Zelda Breath of the Wild*. Nintendo (2017)
65. *The Stanley Parable*. Galactic Café (2011)
66. *The Witness*. Thekla (2016)