A Conceptual Framework for Socienactive Scenarios of Play: a Pilot Study

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ABSTRACT

There is a fuzzy area that differentiates the concepts of game and play. Game design has been discussed in the context of digital artifacts, while play design is an emerging concept and includes more than the digital element. In this work we contribute with understanding of how playful activities can be designed, by integrating the approach of Socioenactive Systems with phenomenological bases for understanding situations of play. The research seeks to overcome the limitations of traditional approaches, which often focus on digital games and neglect the diversity of playful practices found in different cultures and contexts. We propose a conceptual framework considering the social-physical-digital triad, enabling a deeper and more comprehensive analysis of playful experiences. Our main contributions include (i) a conceptual framework integrating phenomenology and Socioenactive Systems; and (ii) a pilot study of an application of a redesign of an existing playful situation. It is expected that the conceptual framework will inspire and inform researchers and professionals to explore the potential of playful practices as tools to promote social well-being and human development.

Keywords

Play scenarios, Socioenactive Systems, phenomenology, co-creation, ludicity

INTRODUCTION

The concept of play remains elusive, multifaceted, and culturally situated. Friedrich Schiller (1875) described play as "the aimless expenditure of surplus energy", an idea revisited by Jesse Schell (2008) to underscore how play informs the structure of games. Schell, along with Scott Rogers (2014), whose definition of video games emphasizes their screen-based mediation, reflects a tradition in game design that sees game as a more structured and goal-oriented activity, derived from - yet distinct from - play.

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Altarriba Bertran et al. (2019) underscore the blurred boundary between play and games. Building on Salen and Zimmerman's (2004) seminal work, they reiterate that games typically involve rules, goals, and challenges, whereas play can emerge freely, even outside the boundaries of formal game structures. Roger Caillois (1961) likewise had already emphasized that play is not only free and imaginative, but also capable of operating within constraints.

To further investigate the phenomenon of play, we draw from the phenomenologically-informed work of Dutch biologist and philosopher F. J. J. Buytendijk (1933; 1973), who characterized play as a mode of behavior. His use of the German term Spiel - richer than its Portuguese or English equivalents - invites attention to its cultural and linguistic nuances. In fact, his 1973 work, in a 1977 Portuguese translation, highlights that spielen refers not only to games or recreation but also to musical performance and theatrical enactment. Such breadth underlines the semantic richness and behavioral depth of play.

In contrast, the field of Game Design - as represented by the video-game designers Rogers (2014) and Schell (2008) - has historically focused on design practices tied to commercial digital games, which require structured workflows and multidisciplinary collaboration. While these frameworks are well-defined for game creation, they offer limited tools for designing playful interventions beyond entertainment, especially in everyday or hybrid contexts.

Play Design, as outlined by Altarriba et al. (2019), offers a complementary lens for creating open-ended, non-entertainment-based experiences. Their approach seeks to blur the line between imaginary and real, proposing that play can be embedded in daily life. Other approaches, notably in architecture and urban design (Hendricks, 2017; Shackell et al., 2008), reinforce the relevance of spatial, physical, and social dimensions in enabling playful experiences.

This study embraces the complexity of play as both a behavioral and a cultural phenomenon. We aim to explore its potential in contexts where digital, physical, and social domains converge. Grounded in Buytendijk's phenomenological insights and informed by ubiquitous computing (Weiser, 1991) and Socioenactive Systems (Baranauskas et al., 2021; 2023), we propose a conceptual framework for scenarios of play that bridges these domains. Our goal is to support the design of experiences that go beyond traditional game structures and better reflect the richness of play in hybrid environments. This investigation is guided by two research questions: (1) How can the concept of play be revisited in ubiquitous computing environments?; and (2) How can we strengthen the concept of play to enhance user experiences in such environments?

To contextualize our inquiry, the next section outlines key theoretical foundations related to Play and Ubiquitous Computing in Entertainment.

BACKGROUND

Fundamentals of play

The concept of play has been investigated across various scientific fields, including biology, physiology, psychology, sociology, philosophy, cultural studies, media studies,

and economics (Kwastek, 2013). In the twentieth century, Johan Huizinga (1938), Roger Caillois (1961), and Frederik J. J. Buytendijk (1933, 1973) provided some definitions of play. Kwastek (2013, p. 71) highlights the linguistic aspects of the word “play”, in English, and “Spiel”, in German. The German term "Spiel" offers a more nuanced perspective on play compared to the English "game." While "game" often implies structured, rule-based activities, "Spiel" encompasses a broader range of playful experiences, including spontaneous, imaginative, and strategic play. This linguistic distinction contributes to a more interdisciplinary understanding of the concept of play in this includes play and games at the crossroads.

Johan Huizinga (1938), Roger Caillois (1961), and Frederik Buytendijk (1933, 1973), three prominent figures in play theory, left a lasting legacy on our understanding of play's cultural importance. Huizinga (1938) sought to establish a foundational understanding of play as the primordial source of cultural expression. He aimed to provide a rigorous definition of play that could serve as a framework for further analysis. His definition, which remains pertinent today, is as follows: Play can be defined as a voluntary activity that exists outside the parameters of ordinary life. It is not motivated by serious intent but can nevertheless be intensely absorbing. It is detached from material concerns and does not yield tangible benefits. The play unfolds within its own defined temporal and spatial framework, governed by established rules, and progresses systematically.

Caillois (1961) characterizes play as a voluntary pursuit that transcends the boundaries of everyday life. It is marked by its freedom, detachment from ordinary concerns, inherent unpredictability, lack of material gain, adherence to specific rules, and its capacity to create a distinct reality. Caillois further classifies games into four primary categories: *agon* (competition, such as chess or sports), *alea* (chance, such as dice or lotteries), *mimicry* (simulation, such as role-playing or cosplay), and *ilinx* (vertigo, such as spinning or roller coasters), providing a comprehensive framework for comprehending the diverse manifestations of play.

Buytendijk (1933, 1973) viewed play as an intrinsic human activity characterized by its spontaneous and expressive nature. He argued that play is essential for human development, enabling individuals to explore their potential, experiment with diverse roles, and cultivate their imagination. Buytendijk underscored the significance of play in fostering creativity, problem-solving abilities, and emotional well-being, highlighting its role in shaping both individual and societal development. In particular, he explored the idea that play objects possess a figurative quality, meaning they can evoke different meanings and interpretations, thus sparking imagination and creativity. He used the term "figurativeness" to describe this characteristic, which allows for multiple interpretations of the play experience.

In the field of game design, Schell (2008) offers a complement to these perspectives by emphasizing the interplay of narrative, mechanics, and player experience in play. Schell’s work allows justifying the importance of designing play experiences that engage not only cognitive and social aspects but also emotional and imaginative dimensions, aligning with phenomenological views on the depth of play experiences.

Building upon the phenomenological work of Buytendijk, this study explores the concept of play offering a novel perspective on the design and development of technology-mediated play experiences. This study contributes to the field by

providing a theoretical foundation for the creation of innovative play experiences that are grounded in phenomenological principles.

Ubiquitous Computing in Entertainment

The rise of mobile phones in the 1990s and advancements in communication technologies sparked significant interest in mobile and location-based games (Björk et al., 2002). Björk et al. (2002) introduced the term "ubiquitous games," referring to games that use ubiquitous computing technologies to enhance traditional genres and foster social interaction among players. They highlight design challenges such as integrating sensing technologies, interpreting social and physical contexts, employing innovative input methods like bio-input, blending physical and virtual realms, and managing unique temporal-spatial dynamics inherent to pervasive games.

The 2002 Special Issue on Ubiquitous Games in Personal and Ubiquitous Computing presented foundational works such as Römer and Domnitcheva's (2002) RFID-enabled smart playing cards for Whist, which influenced later RFID applications in technological toys (Wenston et al., 2013, 2016; Barney et al., 2016; Retnanto et al., 2024).

Manninen (2002) proposed design guidelines for interaction in multiplayer networked games across platforms, defining rich interaction as the seamless integration of diverse interaction methods facilitating intuitive communication. This concept informed subsequent research (Zhang et al., 2021; Rebualos et al., 2022).

Headon and Curwen (2002) introduced a sensing system interpreting human movement to enable natural gameplay through physical environments, a concept echoed in studies on reconfigurable ubiquitous games and rhythmic gameplay transitions (Buzeto, 2016; Abdullah, 2016).

Cheok et al. (2002) presented Touch-Space, a mixed-reality gaming system blending physical and virtual elements to enhance social interaction by integrating real-world environments as game components. Their work influenced augmented reality and IoT gaming research (Guzman et al., 2023; Kim et al., 2023; Xiao et al., 2024).

Weiser's (1991) vision of ubiquitous computing, materialized with sensors, actuators, and microcontrollers, enabled the reshaping of human-technology relationships in gaming beyond screen immersion. This calls for design considerations that integrate physical artifacts, digital processes, and social interactions, leading to the triadic perspective of social-physical-digital interplay of Socioenactive systems.

Socioenactive Systems

Building upon Weiser's vision, Socioenactive systems design (Baranauskas et al., 2021, 2023) conceptualize the design of interactive systems as inherently socioenactive, emphasizing the inseparability of the social, physical, and digital dimensions. This approach recognizes that meaningful play and interaction emerge from the dynamic coupling of people, environments, and technology.

The socioenactive triad considers: (1) Social aspects such as joint attention, joint action and participatory sense-making among participants; (2) Physical aspects

involving tangible artifacts, bodily movements, and spatial contexts; and (3) Digital aspects encompassing software, sensors, and computational processes mediating interaction. This socioenactive framework might guide the design of technology-mediated play experiences that move beyond isolated digital immersion, promoting co-enactive participation where players engage with both physical and social environments in concert with digital systems.

The Socioenactive ideas align with the phenomenological insights from Buytendijk and Schell by foregrounding the lived experience of play as emergent, embodied, and relational. It thus could support the development of innovative play scenarios that integrate ubiquitous computing technologies with rich social and physical contexts, expanding the expressive and experiential potential of games and playful interactions.

THE EASEL FRAMEWORK

In this section, we present the conc**E**ptual fr**A**mework for **S**ocienactive sc**E**narios of p**L**ay called EASEL for short. We organised the framework according to Leshem and Vernon (2007), who presented studies that introduce conceptual frameworks with the following elements: concepts, relations, and attributes.

The concepts that we include in the EASEL Framework are Phenomenology, Socioenactive Systems, Socioenactive Scenarios of Play (SSoP), the concept of Play introduced by Buytendijk (1933, 1973), and Digital Games. Rather than listing these as isolated topics, the EASEL Framework positions them in a dynamic structure that reflects how experiences of play unfold in situated, embodied, and sociotechnical contexts.

Phenomenology, as conceived by Husserl (1913), is a philosophical method that aims to explore the structure and meaning of conscious experience. This perspective is deepened through the enactive approach (Varela et al., 1991), which emphasizes that cognition arises through the active engagement of an organism with its environment. In the context of play, this means that players enact meaning through embodied and situated interactions with digital and physical artifacts. As Fuchs and De Jaegher (2009) argue, these interactions are inherently social and shaped by joint attention and mutual attunement.

Socioenactive Systems emerge at the intersection of phenomenology, enactivism, and human-computer interaction fields. In these systems, the design is guided by a triadic coupling of social, physical, and digital dimensions (Baranauskas et al., 2021; 2023). Such coupling inspires the design of environments where users co-construct meaning through embodied action and sociotechnical mediation. While theoretical foundations are solid, these principles have not yet been applied to playful interactions, particularly in digital game contexts.

The framework proposed in this article seeks to bridge this gap by proposing Socioenactive Scenarios of Play (SSoP) - settings where situations of play are reimagined through socially-aware, embodied, and culturally situated experiences. These scenarios are not only digital but extend into the physical and social realms. Preliminary studies (Brandão et al., 2024) have demonstrated the feasibility of this

approach, showing how digital games can be restructured to foster richer, more meaningful player experiences.

To theorize play within this framework, we draw on Buytendijk (1933, 1973), who analyzes play as a fundamental mode of human expression and self-understanding. He distinguishes between play and playfulness, emphasizes bodily presence, and highlights existential motivations for play - such as the search for meaning, boredom, or relational engagement. These ideas resonate with phenomenological and enactive perspectives, supporting a notion of play as world-making and sense-making.

Digital games, as defined by Rogers (2014) and Schell (2008), traditionally focus on screen-based, rule-driven environments. Schell's ten qualities offer useful design guidelines, but in SSoPs, these are recontextualized to incorporate embodied movement, social co-presence, and physical interaction. Rather than abandoning traditional game structures, the EASEL Framework proposes a layered redesign: Level 1: Integration of socially co-constructed interactions; and Level 2: Embodied engagement across digital and physical boundaries.

The relationships between the concepts are as follows:

- Phenomenology and Play: Play is viewed not as mere activity, but as an existential expression rooted in the lived body.
- Phenomenology and Socioenactive Systems: These systems enact environments that reflect the intersubjective and embodied nature of experience.
- Socioenactive Systems and SSoP: Socioenactive design extends beyond usability to cultivate mutual learning, meaning-making, and shared intentionality (Baranauskas et al., 2024).
- Play and SSoP: Drawing from Buytendijk, play becomes a site of engaged presence, where movement, feeling, and imagination converge.
- Digital Games and SSoP: Traditional behavioral feedback mechanisms are reinterpreted through the lens of embodied interactivity and social attunement.
- SSoP and their Design/Redesign: This relation is defined by recursive co-design, where players, designers, and contexts iteratively shape one another through experience.

What differentiates the EASEL Framework from prior models is its emphasis on the phenomenological grounding of design, and its commitment to play as an existential, co-created activity. Rather than merely adapting digital games to new contexts, it proposes a conceptual reframing of what it means to play, grounded in the realities of bodily, social, and cultural life.

Characterizing Socioenactive Scenarios of Play: Game Qualities and Phenomenological Commitments

To characterize SSoPs, we consider two sets of attributes: Schell's ten qualities of games and Buytendijk's phenomenological dimensions of play. We argue that the interplay between these sets supports the development of systems that might be both technically effective and experientially meaningful.

Schell (2008) identifies ten defining qualities of games. In this section, we examine how these qualities manifest - or not - in Socioenactive Scenarios of Play (SSoP). Rather than assuming all game attributes apply universally, we consider SSoP as situationally situated environments, where participation, challenge, and goal orientation emerge from the specific configuration of the social, physical, and digital dimensions. The following discussion connects each of Schell's qualities to the nature of SSoP.

- (Q1) Games are entered willfully: Yes. Participation in SSoP is voluntary, grounded in a shared willingness to engage. The playful act is not compulsory but arises from mutual readiness to perform within the scenario.

- (Q2) Games have goals: Not necessarily. While some SSoP may include specific objectives, others support open-ended exploration, where engagement emerges from the interplay between players, space, and digital mediation - without the imposition of fixed outcomes.

- (Q3) Games have conflict: Optional. Conflict is not a defining feature of SSoP. Many scenarios promote cooperative or exploratory forms of engagement, emphasizing mutual discovery over competition.

- (Q4) Games have rules: Yes. SSoP are inherently rule-based, but these rules are not solely codified; they also emerge dynamically through the coordination of social interaction, sensorimotor action, and digital response.

- (Q5) Games can be won and lost: This depends on the SSoP configuration. Victory or failure may be present in goal-oriented scenarios, but in exploratory or co-creative play, success is relational, tied to the quality of participation rather than outcome.

- (Q6) Games are interactive: Yes. The very structure of SSoP is built on interaction - between players, between bodies and space, and between human action and digital feedback.

- (Q7) Games have challenges: Sometimes. Challenge may be designed into the scenario, but it is not necessary for play to emerge. SSoP can support low-stakes, curiosity-driven interaction.

- (Q8) Games can create their own internal value: Yes, when value arises from within the scenario. In many SSoP, meaning is not imposed externally (e.g., points or scores), but co-constructed through shared experience.

- (Q9) Games engage players: Yes. Engagement in SSoP relies on joint attention, joint action, and coordinated interaction, requiring mutual presence and responsiveness.

- (Q10) Games are closed, formal systems: No. SSoP are open-ended and permeable. They do not necessarily delimit clear beginnings and endings or enforce rigid structures; instead, they allow transitions between play and non-play, inviting improvisation and emergent dynamics.

To further characterize SSoP, we turn to Buytendijk (1933, 1973), who described play as a paradoxical state—both illusionary and real—where commitment and imagination coexist. Buytendijk's phenomenological lens foregrounds the intersubjective, embodied, and affective dimensions of play, offering a deeper understanding of how players relate to one another and the environment. Below, we map his core notions to SSoP.

1. Curiosity leads to experimentation and the experience of "if-then": Yes. SSoP invites players to act experimentally, engaging in open-ended inquiry. The if-then dynamic—"what happens if I...?"—is central to learning and exploration in these scenarios.

2. Reproduction, i.e. an intentional imitation of one's own behaviour: Possible. When scenarios draw from realistic contexts or role-play, players may reproduce familiar actions to make sense of the environment or co-create meaning with others.

3. Repetition and at least two persons play together as a kind of real morality of purpose: Yes, when the scenario encourages rhythmic or patterned actions (e.g., jumping, throwing), repetition supports attunement and co-regulation. Importantly, SSoP are fundamentally social; they require at least two players.

4. The self-commitment seriousness is not only linked to pleasure: Yes. In SSoP, players often commit to the play frame not merely for fun, but as a way of respecting the shared activity, the others involved, and the emergent narrative of play.

5. Imagination is subjectively experienced: Yes. The illusion-reality oscillation—where players suspend disbelief while remaining aware of the play frame—is key to SSoP. This subjective imaginative engagement sustains the scenario's vitality.

6. Every player wants something to succeed through his actions: Yes. Success in SSoP is not tied to extrinsic achievement but to meaningful interaction. Players seek to be seen, understood, and responded to through joint activity.

7. Self-commitment to the rules of two or more people: Yes. SSoP requires co-enacted rules. These are not only pre-established but continuously renegotiated through social cues, bodily presence, and mutual attunement.

Through this dual lens—game attributes and phenomenological commitment—we highlight that SSoP are not defined by rigid structures or goal-oriented mechanics, but by the quality of shared experience. The EASEL Framework, as outlined earlier, encompasses these dimensions as conceptual elements and relational dynamics. In the next section, we present a set of design attributes that support the development of Socioenactive Scenarios of Play.

The design of Socioenactive Scenarios of Play must include attributes inspired by studies that discuss play (Buytendijk 1933, 1973; Caillois, 1961), socioenactive systems (Baranauskas et. al, 2021, 2023), and digital games (Schell, 2008 and Rogers, 2014).

The Conceptual elements of playful scenarios: Playful scenarios and digital games emerge from the interaction between game design and players' subjective experiences, such as boredom, leisure, and self-consciousness (Buytendijk 1933, 1973). Genres like action, adventure, life simulation, puzzles, and strategy (Schell, 2008 and Rogers, 2014) shape these experiences, connecting to Roger Caillois' (1961) categories: *agon* (competition), *alea* (chance), *mimicry* (simulation), and *ilinx* (vertigo). These conceptual elements create immersive spaces where mechanics, narrative, and player agency converge, generating unique emotions and meanings within the social-physical-digital dimensions (Baranauskas et. al, 2021, 2023).

The Technological elements - physical-digital dimension: This dimension of socioenactive scenarios of play combines devices such as sensors and joysticks with advanced game engines (Schell, 2008 and Rogers, 2014), including Unity and Unreal Engine, to develop interactive environments. This technological integration fosters well-being by supporting learning, health, and behavioral change while enhancing social interaction. Additionally, the ubiquity of these systems (Baranauskas et. al, 2021, 2023) ensures that playing experiences remain accessible across diverse contexts, further expanding their impact and reach.

The Elements of interaction - social-physical dimension: This dimension encompasses various types of play beyond games, such as cooperative, competitive, and narrative interactions (Schell, 2008 and Rogers, 2014). These play types unfold within specific environments shaped by participants' age groups and cultural contexts, which influence the dynamics and meanings of the experience. Building on Caillois' (1961) four categories of play, these interactions reflect how physical spaces, social norms, and individual (social-physical-digital triad - Baranauskas et. al, 2021, 2023) identities converge to create unique play experiences (Buytendijk 1933, 1973).

The social dimension of play, as explored by Frederik Buytendijk (1933, 1973), emphasizes its inherently relational nature, fostering shared meaning through interaction. Socioenactive systems (Baranauskas et. al, 2021, 2023) amplify this dynamic by blending physical and digital elements, enabling collaborative, context-sensitive experiences that transcend individual agency and cultural boundaries.

The physical dimension of play, according to Buytendijk (1933, 1973), involves the interaction of the body with space and the environment. Socioenactive systems (Baranauskas et. al, 2021, 2023), combined with games as described by Rogers (2014) and Schell (2008), enable experiences where physical action integrates with narrative and social dynamics. Table 1 presents how each of the attributes is connected to the related references.

References / Attributes	Buytendijk (1933, 1973)	Baranauskas et. al (2021, 2023	Schell (2008) and Rogers (2014)	Caillois (1961)
Conceptual elements of playful scenarios	X	X	X	X
Technological elements: physical-digital dimension		X	X	

References / Attributes	Buytendijk (1933, 1973)	Baranauskas et. al (2021, 2023	Schell (2008) and Rogers (2014)	Caillois (1961)
Elements of interaction: social-physical dimension	X	X	X	X
Social dimension	X	X		
Physical dimension	X	X	X	

Table 1: Characterization of the Socioenactive Scenarios of Play and References.

We consolidate the EASEL Framework, a conceptual framework for socienactive scenarios of play, in the diagram illustrated by Figure 1. The concepts, relations, and attributes are represented to illustrate the design and redesign of socioenactive scenarios of play.

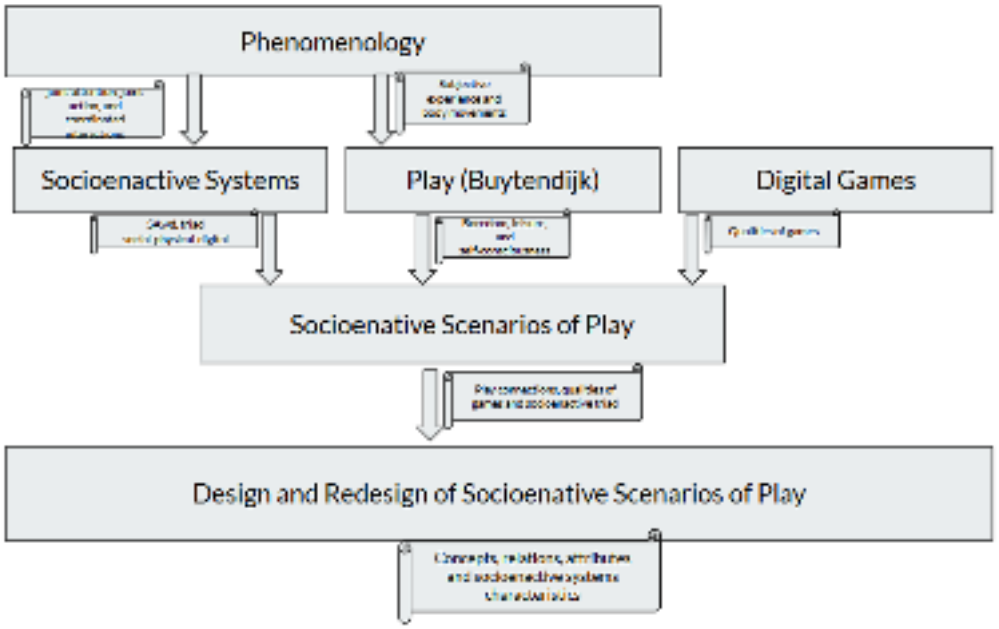

Figure 1: EASEL Framework - concepts, relations, and characterization.

PILOT STUDY: AN ADAPTED SPORTS SCENARIO OF PLAY

The ParaJecripe game is the result of a university-led community outreach initiative at the Federal University of ABC, Brazil, designed to promote visibility for adapted sports and athletes. Detailed information about the game can be found in previous works (Brandão et. al 2016, Domingos et. al, 2017). At its core, the game is made up of mini-games, which are sports activities that are inserted within the possible options for the player. The following mini-games compose ParaJecripe: athletics, swimming, tennis and adapted canoeing, as well as quizzes and a "shop" offering cosmetic items for the game. This section focuses specifically on the athletics mini-game in its original version, presenting the broader context of the ParaJecripe digital game.

In all mini-games, ParaJecripe provides information about the athletes, facts and the history of the games. As players engage in the mini-games for each sport, they stay connected with information that can be used to answer the questions in quizzes. With each mini-game practice, players earn virtual coins, but accessing the quiz section allows them to accumulate even more coins by answering the questions correctly. This encourages players to deepen their knowledge while enjoying the immersive sports experience. With enough coins, it is possible to access the Equipment Shop, where there are options available for purchase to customize the game's main athletes. Each purchase allows for specific customizations of the athletes. Consequently, the next time the player enters a specific mode, the character representing the sport will reflect the changes made through one or more purchases in the shop. This adds a personalized touch to the gaming experience, enhancing the player's immersion and involvement. Figure 2 illustrates a navigation diagram of the ParaJecripe digital game. ParaJecripe is a game designed as an artifact for changing the behavior of typical users. Therefore, this game is not originally adapted for use by people with disabilities.

Figure 2: Navigation diagram of the ParaJecripe game.

The adapted sport chosen for the proposed analysis was the 200-meter dash for visually impaired athletes. This sport was chosen because it has specific interaction mechanics involving at least two people: in athletics they need one another to run. Figure 3 illustrates the racing mini-game with a visually impaired athlete.

Figure 3: The racing mini-game with visual impaired athletes.

The development of a socioenactive scenario of play for the sport of running for visually impaired athletes requires altering the mechanics of the mini-game on two levels. The first level involves altering its digital version to reflect the social and physical aspects inherent in practicing sport in the physical world. The second level in the context of socioenactive systems involves creating a scenario that enhances the social-physical-digital coupling.

ParaJecripe was not originally adapted for use by people with disabilities. However, we anticipate that, with the proposed extensions and improvements to audio feedback, the game will provide access for people with disabilities (PwDs) to participate in the sports disciplines presented.

Race with the Visually Impaired

Player interaction in the running minigame in its original version takes place using the arrow keys, which must be pressed alternately (right and left), repeatedly, until the end of the race. The player controls the guide and the runner with visual impaired avatars in the same operation. This athletics minigame demands speed from the player, who controls the pair (impaired runner and his/her guide). At the first level of extension, the player's interaction with the running mini-game was altered to reflect two players: the visually impaired athlete (who wears a blindfold) and the guide. Therefore, this mini-game has now two players simultaneously practicing the sport in the same way as in the physical world. The steps of each leg must be inversely coordinated, as in the real world sport, i.e., a step by the athlete with the right leg implies a simultaneous step by the guide with the left leg and vice versa. The same mechanics of the legs would be reflected in the arms. With these adaptations made from one to two players, the social element of the socioenactive triad has a role in the game. Figure 4 illustrates the first level of extension of the racing game.

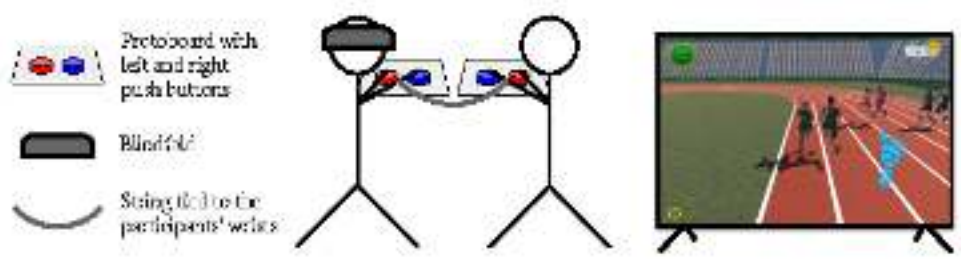

Figure 4: First level of extension of the racing mini-game for two players.

Moreover, it was possible to draw a second level of extension in the game, toward the context of a socioenactive scenario. Besides being practiced by two people, the digital system was adapted to include physical artifacts of interaction. Thus, one player would put on a blindfold, as is actually the case in the real sport, and the other player would act as the guide, without a blindfold. The participants now use specific concrete buttons in protoboards as artifacts for physical interactions with the system. These artifacts will still be extended with sensors to enhance the experience of both players. Each person's "steps" (enacted by the hands, actually) must be inversely coordinated. Thus, for the race to go smoothly, the player enacting the visually impaired athlete's avatar must communicate by voice with the player enacting the guide avatar, ensuring the movements of their hands are performed in a joint and coordinated manner. Also, a strip connecting the right hand of the one with the left hand of the other signalizes the behavior of the hands and rhythm of the coordinated "steps" necessary for the run. Communication between the players, by voice and by the perception of the other's hand movements, would characterize the social elements of the game's social-physical-digital triad. Figure 5 illustrates the second level of extension for the racing game.

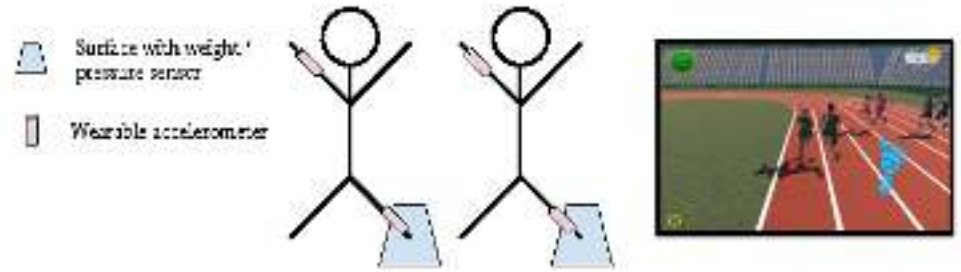

Figure 5: Second level of extension of the racing mini-game for two players and sensors included.

The specific format of the technical implementation of this proposed adaptation was made in a preliminary for experimentation with the development of proofs of concept. Other main candidates for physical implementation are: 1) the use of floor plates with weight/pressure sensors, capable of detecting when someone steps on them, as in the simulated movement of imitating a run; 2) the use of accelerometers in a wearable format (e.g., armband and/or anklet), enabling capture movements characteristic of the running action. Figure 5 illustrates these two possibilities. In both cases, the data must be captured by a controller responsible for communicating

with the digital game, and the players' performance will be directly proportional to the timing and speed of their movements as detected by the chosen sensors.

DISCUSSION

By extending the original version of the ParaJecripe digital game, we explored the relations among the concepts in the EASEL Framework. We summarize below how the relations are defined in the extended version of the ParaJecripe socioenactive scenario of play.

1. Phenomenology and Play: play can emerge as a bodily and subjective experience through the movements of each player during their performance.
2. Phenomenology and Socioenactive Systems: the players must communicate to each other to coordinate their movements in the physical environment with the sensors to make the avatar runners act in the digital environment. This is connected to experiences through joint attention, joint action, and coordinated interactions.
3. Socioenactive Systems and Socioenactive Scenarios of Play: we proposed two levels of extension of the original digital artifact to include the socioenactive triad social-physical-digital dimensions. In this sense, the SSoP that we propose creates opportunities for a redesign while applying the SAwD and its instruments to improve this scenario of play.
4. Play and Socioenactive Scenarios of Play: the extensions of the game can promote the interplay between physical and mental processes. The original game was a single player artifact that denied any form of interplay and physical processes.
5. Digital Games and Socioenactive Scenarios of Play: the players should maintain the joint attention, joint actions and coordinated interactions during their performance. These actions are reflected in the movements of the avatars in the digital environment. If the players get lost in their collaboration the avatars will stop their running actions.
6. Socioenactive Scenarios of Play and the Design and Redesign of Socioenactive Scenarios of Play: the inclusion of the social-physical-digital triad in the extended version of the game can promote the design and redesign of the digital artifact with characteristics of a socioenactive system.

Considering the qualities of digital games introduced by Schell (2008), the SSoP version of the ParaJecripe game is intended to promote willful experiences (Q1) in a joint goal (Q2) in which the players must cooperate to finish their run. Even if the main goal of the players is to finish their run, they can compete against virtual avatars controlled by an Artificial Intelligence algorithm and this can be considered a kind of conflict (Q3) in the game in a rule-based (Q4) playful experience. Because we consider that finishing a run is a successful event, we do not consider that there is a losing condition (Q5) in this interactive experience (Q6). The challenge (Q7) in the game is to achieve the goal of finishing the run by means of the joint attention, joint actions and coordinated interactions in an engaged (Q9) connection to each other. If the players want to compete against the other virtual avatars they can consider that the game has internal values (Q8). The SSoP promotes interactions between the players, between players and the digital artifact, and between players and the environment forming an open system (not Q10).

The Buytendijk's committing connections are included in the SSoP ParaJecripe as follows. The players can play willfully with curiosity and their actions depend on "if-then" conditions (1). They must reproduce movements imitating (2) real-life situations repeating actions in a self-committed (3, 4) way. The players have the opportunity to imagine (5) themselves in a stadium running in an illusionary act of play. They will want to succeed (6) achieving the finish line according to the rules (7) of this scenario of play.

Players can experience the SSoP ParaJecripe in leisure or self-consciousness contexts. It is a life simulation (sports game) and a *mimicry* category of play. The digital artifact was developed in the Unity game engine and includes the use of sensors instead of joysticks or keyboards in an ubiquitous entertainment scenario. The players can have a shared meaning in their experience through their in-game cooperation. Moving their bodies together, the players have a social experience using sensors in a physical environment and a digital artifact.

We answer our research questions of this work as follows: (1) How can the concept of play be revisited in ubiquitous computing environments? In this study, we revisited the concept of play according to Huizinga (1938), Caillois (1961), and mainly with Buytendijk`s (1933, 1977) studies. We presented the EASEL Framework, a conceptual framework for socioenactive scenarios of play which considers concepts, relations, attributes and a characterization of socioenactive scenarios of play. The Socioenactive Systems (Baranauskas et. al, 2021, 2023) consider the social, physical and digital dimensions. In this triad, the concepts, relations, attributes, the concept of play is revisited in the ubiquitous computing environment.

Answering the second research question; (2) How can we strengthen the concept of play to enhance user experiences in ubiquitous computing environments? We introduced a pilot study that illustrates the redesign of a previously existing digital game into a socioenactive scenario of play (SSoP). The ParaJecripe SSoP illustrates how researchers can apply the EASEL Framework to promote a socioenactive scenario of play in a ubiquitous computing environment.

The introduction of a conceptual framework of play design promotes an opportunity for researchers to discuss the concept of play according to authors who began this dialogue in the beginning of the twentieth century. The study presented by Altarriba Bertran et. al. (2019) introduces the Situated Play Design SPD) where they mention that there is a thin line that differentiates game from play. According to Salen and Zimmernan's work (2004) games commonly depend on a predetermined, well-defined structure, consisting of objectives, rules, and challenges to overcome. On the other hand, play can emerge outside of games and does not always require challenges or a clear outcome (Salen and Zimmerman, 2004). The SPD is focused on contextual play and has three steps that designers should conduct. In our EASEL Framework, we provide concepts, the way these concepts are related, the attributes and a characterization of socioenactive scenarios of play in ubiquitous computing contexts. This study is part of an ongoing research that we intend to improve with more experiences in the ParaJecripe SSoP, redesign of other existing digital games, and design of new scenarios of play applying the EASEL Framework.

CONCLUSION

Research in games is characterized by authors who present and discuss game design focusing on contexts in which the digital artifact is the main element of play. However, we live in a world where sensors, displays, and computing devices are embedded in our environments, defining a ubiquitous context in our daily activities. The concept of play from a phenomenological point of view considers the inter- and intra-subjective relations of players within the entire environment. In this study, we presented the EASEL Framework to provide researchers with a foundation for designing new play experiences or redesigning previously existing digital games to create scenarios of play that consider, among other elements, the triad social-physical-digital dimensions. The pilot study of the ParaJecripe game illustrates a redesign from an existing digital game to a socioenactive scenario of play.

For further discussion and improvements of the EASEL Framework, it is necessary to design new scenarios of play and redesign other existing digital games. Experimenting with SSoP in domains such as play for learning, play for health, and play for change will create opportunities to enrich research in the field of play within ubiquitous computing environments.

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