

# Designing XR Games that Bring us Closer: A Workshop to Combine Game Design and Psychological Determinants of Closeness

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Figure 1: SPIELEND scenario 1, playing with friends.

## ABSTRACT

The following paper discusses the SPIELEND project, which aims to foster social connections through play among friends and families separated by physical distances using Extended Reality (XR) and smart textiles. The project combines psychological insights on closeness with game design to create XR games that bring people closer. The paper outlines a workshop conducted as part of the project, where participants explored various game mechanics and their impact on social closeness. Preliminary findings show the successful combination of game principles and closeness determinants, paving the way for further development, evaluation and socially enriched game design. The SPIELEND project explores solutions

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for addressing the challenges of distance and social isolation in modern society.

## CCS CONCEPTS

• **Human-centered computing** → *Mixed / augmented reality*.

## KEYWORDS

augmented reality, extended reality, game design, games, play, social presence, closeness, intimacy

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## 1 INTRODUCTION

In our society, it is quite normal that friends or family members move to another city or, due to ongoing globalisation, even go abroad for reasons of study or work. In-person meetings become rare, a lot of communication happens digitally, even more so during the COVID-19 pandemic: 52 percent of people aged 16-29 used video calls to communicate with family and friends [3]. Nevertheless, digital communication lacks spontaneity, non-verbal exchange and emotionality and thus is in its current form not able to replace meetings in co-presence, as became obvious when "Zoom fatigue" spread during COVID-19 [1]. To make matters worse, according to the World Health Organization (WHO) we are in the middle of a mental health crisis with increasing numbers of depression and anxiety, especially among young people [9]. This made us wonder: How can we foster true social connection across distance? And what technological tools can we use or create for this purpose and how can we determine whether these brought people actually closer? The project SPIELEND (short for: "Soziale Präsenz durch immersive, emotionale und lebendige Erfahrungen von Nähe auf Distanz") [German for "playing"] addresses these questions by developing innovative approaches for creating high quality social interaction and fostering closeness among family and friends living across distance through play.

## 2 SPIELEND PROJECT

The SPIELEND project investigates how to design a game fostering closeness and social presence, through play, sensory modalities and representation of the fellow player. For this purpose, we aim to develop game concepts based on existing game patterns, and extend them with sensory qualities using Extended Reality (XR) and Smart Textiles. As an interdisciplinary project, funded by the Federal Ministry of Education and Research Germany, the SPIELEND project will (1) investigate psychological concepts and their influence on experiences of closeness in a game situation and develop new measurement methods, as currently many different psychological concepts are used in HCI [10] (Julius-Maximilians University Würzburg), (2) conduct a user-centered design process

to design different games and other essential components to promote social closeness (University of Wuppertal), (3) investigate and realise the Extended Reality components and player representation (Augmented Robotics and OFFIS), (4) and develop Smart Textiles for enhanced sensory experience through wearable and tangible game components (ITA Group of the Aachen University). In the first phase of the project, different psychological concepts (e.g. social presence, closeness, intimacy, togetherness) were investigated and factors influencing these concepts were collected. Further, 21 user interviews on the topics of playful habits, shared play, and emotional closeness were conducted and informed the design of user scenarios and personas.

## 3 A WORKSHOP TO DESIGN CONCEPTS FOR XR GAMES THAT BRING US CLOSER

In this position paper, we want to report how we designed and conducted a workshop to design concepts for XR games that bring people closer despite physical distance. To achieve a shared vision of the planned XR-game application within our project group, it was necessary to create a common understanding of the previously conducted work and findings as well as selecting influencing factors on closeness and game patterns. For this, we organised a workshop where all participants became familiar with visions, psychological factors for enhancing closeness, and were able to experience the game mechanics first hand. Furthermore, the workshop offered space for feedback and exchange and provided a starting point for the process of a game design which fosters closeness and can be realised through augmented reality and smart textiles.

### 3.1 The Workshop and Material

The workshop took place as part of a project meeting in Berlin in October 2023. Nine people participated in the workshop, including four of the authors of this paper who had prepared the workshop. Overall, the workshop took three hours from start to finish. The workshop was structured as follows: (1) introduction to the workshop, (2) introduction to our *10 ways to design concepts for XR games that bring us closer*, (3) presentation and discussion of two XR game scenarios, (4) game circle and assessing closeness determinants, (5) group reflection. Below, we will provide insight into every phase.

**Introduction to the Workshop.** First, we welcomed all participants and introduced the premise of the workshop, namely testing game patterns and assessing how the game might foster closeness through psychological determinants.

**Introduction to our *10 Ways to Design XR Games that Bring us Closer*.** The second phase of the workshop introduced participants to *10 Ways to Design Concepts for XR Games that bring us Closer*. Through literature research across different concepts of closeness (e.g., [2, 4, 5, 7, 8, 10]) in the run-up to the workshop, we had identified a total 95 influencing factors. In order to make them usable in a half-day workshop for game design, we categorised them into two groups: 1) more relevant for fundamental game conception, which need to be addressed in the early stage of game design (35 influencing factors relevant for the workshop), and 2) more detail-oriented, which can be incorporated later in the process. We inductively clustered the influencing factors deemed relevant for



Figure 2: SPIELEND scenario 2, playing with family members.

game conception into 10 determinants: (1) *Non-verbal Communication*, (2) *Modality and Tangibility*, (3) *Shared (Embodied) Experience*, (4) *Self-disclosure*, (5) *Supporting Each Other*, (6) *Perspective Taking*, (7) *Integrated Communication*, (8) *Nature of the Task*, (9) *Frequency and Duration*, (10) the *Unforeseeable*, as well as aspects *Beyond the Game*.

**Presentation and discussion of two MR game scenarios.**

As a cornerstone of the game development, two scenarios and five personas had been developed based on the user interviews. The focus in this project is on spatially separated relationships between friends (scenario 1, see Fig. 1) and family members (scenario 2, see Fig. 2). The first scenario shows two friends maintaining their relationship over a greater distance. However, both lack the feeling of being together that can only be poorly covered by telephone calls. The novel game, in which both friends have XR glasses and tangible smart objects, supplements communication with a shared immersive activity and the feeling of co-presence. The second scenario shows a shared gaming experience between family members (daughter and mother). In contrast to scenario 1, here only one person has XR glasses, while the other person plays via a mobile device. In this scenario, on the one hand, the difference in technology affinity as well as the different end devices is decisive as a starting point for the game development and the fulfilment of user needs.

**Game circle and assessing closeness determinants.** For the game circle activity, participants were grouped in pairs. Five stations offered a variety of mini-games, across different categories: competitive, cooperative or communicative; focused on the body, a game board or the room. Each of the games focused a different combination of these categories as well as different game patterns, which have been proven to have a positive impact on social interaction. The first game was a board game, focusing the game pattern of lying and cheating, where people had to guess whether their opponent had lied about a randomly drawn card and to lie in order to cross the finish line first. The second game used body movement and nonverbal clues as game pattern combination, in which participants explained prompts to their fellow players through pantomime. The third game was of a cooperative nature based on the game pattern of asymmetrical information and complementary abilities. One player was equipped with a map and had to guide the other across a field of mines to the treasure. The fourth game required both participants to physically interact with a flexible game board to guide a marble to its destination, exploring a movement-based game. In the fifth game, players were given different texts and images. They then had to interrogate the other player to find out whether they were on the same team or opponents and in the end complete the

EINFLUSSFAKTOREN X SPIELMECHANISMEN

### 1. Nonverbal Communication

**Nonverbale Kommunikation (*social presence*)**

- Physische Nähe (wird positiv beeinflusst durch Sichtbarkeit der Mitspielenden)
- Förmlichkeit der Kleidung
- Gesichtsausdruck

**Expressiveness (*intimacy*)**

- Möglichkeit Emotionen auszudrücken

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**STATION 1:** \_\_\_\_\_  
 Der oben beschriebene Einflussfaktor passt zu diesem Spielmechanismus bzw. lässt sich gut integrieren oder anwenden:

Ja Wie könnte der Einflussfaktor auf den Spielmechanismus angewandt oder integriert werden?

Nein: Warum nicht?

Figure 3: An exemplary docket snippet showing the determinant's name and definition and space to evaluate the first mini game based on the determinant.

text and solve the mission. In this game, ambiguous relationships and asymmetrical information were evaluated.

Before starting the game circle, we provided every participant with two dockets for evaluating two closeness determinants after each mini game (see 3). The docket included the name and details about the determinant and space for each mini game's evaluation, in which we asked whether the determinant fits well, is already part of this game, or how it could be applied. If not, participants were asked to provide their reasoning.

**Group reflection.** Finally, we had every participant reflect how their assigned closeness determinants fit with each mini-game and whether they thought it could be used to foster closeness. Insights were, for example, that the factor *Frequency and Duration* worked better with repeatable games, rather than "one and done" game mechanics with limited replayability, like in game five. Regarding *Modality and Tangibility*, one participant suggested the game board from game four, where players are guiding a marble together, as a physical memento of the game situation: it could be integrated into player's everyday surroundings as a decorative object to increase closeness. Further, *Integrated Communication* was discussed regarding game three, where one player guides their partner toward treasure: The closeness could be improved if the communication was required to go both ways by design, not just from the player with the map to the treasure hunter. Further findings from the participants related to *Nonverbal Communication* in game scenarios, for which visual contact with the other players is a prerequisite in order to be able to read them. It was also found that intensive

gameplay leaves little time for communication and exchange, which in turn is not an optimal prerequisite for social closeness.

### 3.2 Preliminary Findings and Discussion

Currently, we are in the process of analysing the responses from the dockets. From our closing discussion, we can say that generally, the combination of closeness determinants and game principles worked quite well. We were able to gain valuable insights and design approaches for our general development process, and found that closely linking the psychological model and the game components right at the beginning of the design process proved to be useful. Further, we observed that *Nonverbal Communication* is hampered or difficult to apply in games which require the main focus on the game (board). Contrary, *Modality and Tangibility* are hard to incorporate when the main focus relies on the fellow player. Implementing *Self-disclosure* was identified to be difficult to incorporate in game mechanics, because it happens more subtle as a side effect or needs to be incorporated explicitly.

### 4 RISKS, CHALLENGES AND LIMITATIONS

The exploration of game mechanisms and the associated psychological closeness determinants, fused in this workshop, serves as a crucial component of the theoretical foundation for the game design process. Besides designing a symbiotic combination of game patterns and suitable closeness determinants, we identified future challenges during the workshop, particularly related to the transfer of interactions into a remote situation with technical components, as planned for the final application in Augmented Reality.

Initially, the reliability of technical components and a stable connection are prerequisites for smooth interaction. If these conditions are not met and the interaction flow between players is interrupted or delayed, it can negatively impact the perceived social closeness and eventually create a frustrating experience. Also, the synchronicity of movements, along with the perception of synchronicity by others, may not fulfil the desired positive effect on perceived social closeness if hindered by technical issues. These minor discrepancies could lead to a less immersive experience for players, potentially causing discomfort in the worst case scenario.

The resolution of these individual risks, challenges, and limitations will become evident in the further development process. By raising awareness of these challenges early on, we can derive design guidelines and establish a comprehensive solution approach within the system. On the technical side, the risk of disruptions in the digital space can be minimized in advance through appropriate design, which demands minimal computational resources, such as the use of graphics with low polygon density. In terms of content, framing the player experience by the right amount of storytelling aims to mitigate minor disruptions by contributing to player immersion. Furthermore, this is complemented by a system with diverse components, such as smart textiles, resulting in a multisensory feedback and experience. And finally, embedding not one but various social closeness determinants and player motivations are an integral part of the game design in order to engage players in different ways and enhance replay value.

### 5 CONCLUSION

Combining insights from the psychological literature on closeness determinants and research on game design, we developed and conducted a workshop, where participants could try out different game mechanics for themselves, and in the process, evaluated possible ways to create a closer social experience with their co-players. We found this combination useful and relevant to the design process, especially in the early stages. The feedback we received from the participants confirmed our assumptions and prior research.

### 6 WHAT'S NEXT?

Moving forward, we will use the workshop results to guide our selection of game mechanics and the game's design, with intermediate evaluations of the effect on closeness between players. Also, we plan to use the generated insights to further narrow down our theoretical conceptions about closeness in the context of play. To evaluate the final prototype, we will draw from existing evaluation methods, and further develop a new evaluation method for assessing closeness based on image schemas [6].

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