IMX 2024 Doctoral Consortium Paper

Enhancing Corporate Team Dynamics through Social Virtual Reality

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Abstract

In the contemporary landscape of corporate well-being initiatives, various companies focus on team building as a crucial element for fostering positive employee experiences. The research aims to pioneer innovative team-building approaches by leveraging the power of Social Virtual Reality (SVR) and integrating this cutting-edge technology into corporate well-being strategies. SVR offers immersive spaces where users can interact, socialize, and play, providing an exciting opportunity to develop a distinctive and captivating team-building experience.

This interdisciplinary research combines digital media design and organizational psychology. Specifically, this approach underscores the importance of user interaction, design optimization, and organizational psychology dynamics to generate unique team-building experiences within SVR. The main objective is to determine team-building variables that impact team cohesion and personal well-being. The next step is to design an SVR space to enhance these variables through team-building experiences and analyze their actual impact. Eventually, the VR space will be incorporated into a real venture as part of a corporate ecosystem. All milestones will be accomplished in collaboration with the Faculty of Psychology and Education Science.

CCS • Human-centered computing • Collaborative and social computing • Empirical studies in collaborative and social computing

Additional Keywords and Phrases: Social Virtual Reality, Team Dynamics, Immersive Environments, Organizational Well-being

1 Review of the State of the Art

The merger of VR design from a digital media perspective and team-building dynamics from an organizational psychology perspective represents an innovative interdisciplinary approach that has yet to be extensively explored in literature. In response, this research aims to pioneer a framework for creating team-building experiences in a Social Virtual Reality (SVR) environment, blending computational methodologies with psychological and organizational objectives.

In the realm of virtual and immersive reality, marked by significant advancements in gaming, training, and simulations [1], [2], [7], the exploration of collaborative, responsive, and adaptive team-building environments in a

corporate context remains largely uncharted. Different studies have explored aspects like the role of social presence in VR environments, examining how realistic interactions can enhance users' social presence in VR settings [6]. These settings are particularly fascinating when viewed through the lens of embodied social interaction, which includes, among other things, how agents and avatars are perceived and how it affects the individual and the experience from various angles [14]. The potential of VR in practical training and skill development, as indicated in scenarios like fire-fighting training [15], also suggests its applicability in various contexts. It is especially interesting from the angle of Virtual Reality simulation realism and its' specific emotional and bodily experience.

SVR, as a recent phenomenon linked to the emergence of VR platforms like Roblox, VRChat, and Meta Horizon Worlds, focuses on social interactions. It has been extensively studied as a mental health support tool, providing users with an accessible means to engage in social activities, interact with others, alleviate negative thoughts, and foster strong social bonds [11]. Moreover, the literature highlights that being part of an online group facilitates stronger feelings of belonging [4].

Central to this inquiry is exploring how SVR can act as an innovative mechanism in practical settings, primarily aimed at improving employee well-being and enhancing collaborative practices within organizational structures. This focus aligns seamlessly with the overarching goals of the research, emphasizing the potential of SVR to revolutionize traditional team-building methods. This focus is relevant to the present because, with the rise of remote work and virtual teams [9], understanding and innovating in virtual team building has become crucial for modern organizational success.

Since VR's rise, SVR platforms have demonstrated high engagement levels and impact on social connectedness and wellbeing, even in non-specified, casual spaces [11]. This suggests that structured, well-designed SVR environments could revolutionize team-building activities by simulating realistic interactions and promoting team cohesion, problem-solving, and communication. The outcomes of this research could influence academic discourse, real-world practices in team-building [5], and VR design. Additionally, this research promises various benefits across sectors by setting the stage for a new wave of academic exploration.

Considering SVR's significant potential and integrating it into corporate strategies, companies can create experiences that effectively enhance team performance and employee wellbeing. It provides new content delivery methods, potentially impacting the HR tech, eLearning, and EdTech sectors and leading to potential commercial collaborations [3].

2 Research questions

1. What communication patterns and problem-solving approaches can be extracted from user interactions within the SVR team-building experiences?

This question delves into the depths of user interactions in virtual reality (VR), seeking valuable and novel insights into team dynamics, communication patterns, and problem-solving approaches. The gathered insights aim to play a vital role in shaping VR design and conducting a thorough analysis of team behavior in digital environments, particularly each participant's experience and reaction [6].

RQ1 Focus: Communication Patterns

Method: Conduct user interaction studies within SVR environments.

Output: Detailed analysis of communication patterns and problem-solving approaches in SVR. The result will define the design of SVR guidelines for effective communication.

2. How does the integration of SVR impact specific variables of team cohesion and well-being within team-building experiences?

This research question explores the dynamics of incorporating SVR into team-building experience and its influence on team cohesion. It specifically examines how this integration affects variables associated with the strengths of interpersonal connections within a team. The focus includes evaluating the impact on the team's collective spirit, the sense of togetherness among team members, the ease of communication within the virtual space, and the development of trust among individuals. Examining these variables provides a nuanced understanding of how SVR shapes a cohesive team environment, emphasizing the qualities that define strong ties among team members [8], [10].

RQ2 Focus: Team Cohesion and Well-being

Method: Pre- and post-SVR experience questionnaires and interviews with corporate representatives.

Output: Identification of key variables affecting team cohesion and well-being, leading to the development of specific SVR features that enhance these variables.

3. How can integrating VR design with team-building dynamics contribute to outlining an innovative framework to design SVR team-building experiences?

SVR provides users with an easy way to engage in social activities without leaving their houses. Through this experience, people practice social interaction, reducing negative thoughts and forming strong social bonds and connections. [11] [4]. Thus, this question explores merging VR design and team dynamics, emphasizing the creation of team-building experiences in an SVR environment.

RQ3 Focus: Innovative Framework

Method: Final design and testing of SVR environments, expert feedback, and pilot studies.

Output: Guidelines for production, including key components and best practices for designing team-building experiences using Social VR technologies.

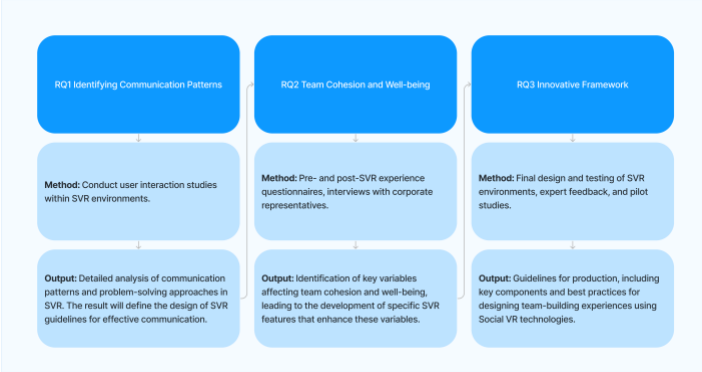

Figure 1. Research questions and their connection. Connection represents an iterative approach where space is re-designed from question to question according to the received output.

3 Methodology of the research

This research adopts an interdisciplinary approach, combining digital media design, organizational behavior, and computational sciences. Through a mixed-methods approach that integrates quantitative and qualitative modes of inquiry, the ultimate goal is to develop an innovative framework for designing innovative SVR team-building experiences. The following table further explains the approach.

3.1 Literature Review

Existing literature on VR design, team-building dynamics, and their intersections with organizational psychology was comprehensively reviewed. Data were gathered from research studies conducted from 2009 to 2023, including one study conducted in 1989, utilizing Web of Science and ACM Digital Library databases.

3.2 Technological Familiarization

Practical implementation proficiency in Unity and C# is currently improving through various online courses and resources. This learning process involves engaging with comprehensive tutorials on the Unity Learn Platform and documentation to ensure a robust understanding of these technologies, which are pivotal for creating effective SVR environments.

The list of courses that are currently being studied [16]:

- Unity Essentials Pathway. This pathway offers a broad introduction to the Unity engine.

- Create with Code. This course covers the fundamentals of C# programming within the Unity environment.
- VR Development Pathway. This specialized pathway provides targeted training on VR-specific features.

In addition, other additional resources are employed in the learning process. Such as:

- Unity Documentation. This documentation is extensively utilized to understand the engine's features, functions, and best practices.
- YouTube Tutorials. Channels such as Valem Tutorials, CodeMonkey, and Unity's official YouTube channel offer practical tutorials for advanced development.
- GitHub Repositories: Open-source projects on GitHub, especially with MIT License, provide coding standards and virtual world design patterns.

The necessity of gaining proficiency in Unity and C# arises from their critical roles in the development of SVR environments:

- Industry Standard Tools: Unity's powerful engine and extensive VR support make it a suitable platform for VR development, ensuring research uses cutting-edge tools.
- Customization and Flexibility: Advanced Unity and C# skills enable smooth interactions, performance optimization, and tailored VR features for team-building.
- Rapid Prototyping and Iteration: Unity supports quick iterations based on feedback, which is crucial for refining SVR environments to meet research goals.
- Cross-Platform Development: Unity's ability to deploy across various VR platforms (e.g., Meta Quest, HTC Vive) ensures broad applicability and accessibility in diverse corporate settings.

3.3 Virtual Environment Design

An SVR environment will be designed and implemented, utilizing Unity and Spatial.io, ensuring alignment with research objectives. The SVR space will be adjusted a minimum of two times during the research due to the study's iterative approach.

Each participant's group will receive foundational knowledge about immersive media and instructions on how to utilize VR technologies effectively. Moreover, the following guidelines will be applied in my study to accommodate diverse employee needs, including those with unfamiliarity with VR technologies [17]:

- Persistent Instructions: Instructions will be accessible at all times to mitigate misunderstandings and memory lapses. This ensures that users can refer back to the instructions whenever needed.
- Corrective Feedback: Providing detailed corrective feedback is crucial. Beyond binary responses, feedback will explain what was done right or wrong to facilitate better learning and task performance.
- Visual Cues: Visual elements will be used extensively as VR environments are primarily visual. These cues will serve as persistent and clear spatial indicators within the VR environment.
- Multi-Modal Instructions: Combining visual, audio, and potentially haptic modalities will be employed to convey instructions. This redundancy ensures information is noticed and fits different learning preferences.
- Mirrored View for Experts: Experts will have access to a mirrored view of the user's VR experience to provide accurate guidance. This helps instructors understand the user's perspective and offer more effective support.

To support users with disabilities in the SVR onboarding process and VR usage, the following inclusive strategies will be applied:

Accessibility Features:

- Implement Text-to-Speech for visually impaired users.
- Use Speech-to-Text to convert speech into text for deaf users.
- Allow customization of text sizes and contrast settings for better readability.
- Provide subtitles and captions for all audio content.

Customizable Control Schemes:

- Support adaptive controllers for users with physical disabilities.

- Customizable Controls:
- Enable control remapping to suit individual user needs.

Enhanced Visual Cues:

- Use prominent visual cues to highlight important objects and instructions.
- Incorporate aids like arrows and pop-up tips that remain visible until dismissed.

Multi-Sensory Feedback:

- Utilize haptic responses for tactile feedback to assist visually impaired users.
- Implement directional audio cues to help users locate objects or instructions.

3.4 Digital Fieldwork and Data Collection Before/After SVR Experience

Currently, the method of working with team-building variables is based on research by Warmelink et al. [8]. In order to capture quantitative data, a straightforward quasi-experimental study design will be utilized to evaluate the team-building potential, which includes filling out questionnaires before and after the experience. As an additional method, semi-structured interviews will be used to provide qualitative insights.

A significant aspect of design study is the iterative approach. This means that different versions of the SVR experience will be deployed based on findings from research questions one to three accordingly. The iterative approach ensures a comprehensive understanding of the variables affecting team cohesion and well-being.

Following the best practices, the concept and accompanying instrument of team cohesiveness by Seers and colleagues will be used as the primary operationalization of 'team building' [10] – team cohesiveness is based on the strengths of ties between all the individuals, exemplified through a sense of team spirit, togetherness, ease of communication, and trust. Team cohesiveness will be measured both pre- and post-experience, using the same scale, to indicate the SVR team-building effect.

3.5 User Interaction Study

User interactions within the SVR environment will be analyzed for insights into team dynamics, communication patterns, and problem-solving approaches. Diverse 10-20 participants with prior experience in real-time environments, including VR, will be targeted to ensure a broad range of perspectives. [13]

3.6 Data Analysis

Both qualitative and quantitative approaches will be employed for data analysis. Thematic analysis, narrative analysis, and discourse analysis will be conducted for qualitative data, while correlation and regression analyses will be implemented for quantitative data.

3.7 Ethical Considerations

Ethical research practices and participant well-being will be ensured, prioritizing the welfare and consent of research participants. The privacy and anonymity of participants will be safeguarded, and diverse participant recruitment strategies will be employed. [12]

3.8 Framework Design

Based on collected and analyzed data, a framework structure will be drafted to address research questions. The main components will be identified, and their relationships will be specified. The framework will be validated through expert feedback and pilot studies, refined based on feedback and findings, and evaluated for effectiveness in providing insights into research questions.

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