Social XR for Pre-Production Meetings: An In-the-Wild Study of Early Stage Communication Between XR Producers and Clients

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Figure 1: An XR producer in Copenhagen (left) and a museum curator in the Netherlands (right) meeting inside a shared Social VR environment (center) during an early-stage XR pre-production meeting. Participants are captured in real time and represented through 3D point-cloud self-representations.

Abstract

Professional collaboration in XR production requires aligning spatial vision between stakeholders with different roles and expertise. While producers understand XR design affordances, clients often lack experiential knowledge, creating communication gaps during early project discussions. Conventional 2D meeting platforms cannot adequately support discussing inherently spatial XR concepts. We explore how Social XR addresses this challenge by situating both parties within a shared three-dimensional meeting environment. Through an in-the-wild study with XR producers in Denmark and museum curators in the Netherlands (N=8), we examine how shared immersive space shapes pre-production communication. Our findings demonstrate Social XR's value for improving communication compared to conventional meetings: clients gain direct spatial understanding of XR possibilities, while producers can observe client reactions and guide discussions in real time. The study also reveals divergent meeting intentions between producers and clients - a dynamic invisible in 2D contexts. Additionally, we discuss implications for designing and evaluating collaborative XR meeting environments where success depends on aligning creative vision rather than completing defined tasks.

CCS Concepts

• **Human-centered computing** → **Virtual reality**; **Collaborative interaction**; **User studies**.

Keywords

Social Virtual Reality, Immersive Environments, XR Production Workflow, Communication

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1 Introduction

Following the COVID-19 pandemic, platforms such as Zoom[1], Miro[2], and Figma[3] have enabled efficient remote collaboration across industries, yet these tools remain fundamentally two-dimensional. For XR (Extended Reality) production - where ideas, interactions, and experiences are inherently spatial - this constraint becomes a critical challenge, as project discussions rely heavily on shared spatial understanding.

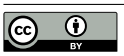
XR production typically follows a multi-stage workflow consisting of pre-production, production, post-production, and post-release [4, 9, 14]. Projects begin with pre-production, where clients and producers meet and negotiate project direction, including concept development, research, and early prototyping. Production implements concepts iteratively into XR experiences; post-production focuses on refinement, testing, and finalization; and post-release involves deployment, maintenance, and longer-term evaluation. Due to the exploratory nature of this early phase, *pre-production* meetings are particularly vulnerable to miscommunication [9]. At this stage, when clients and XR producers meet to negotiate project vision, scope, and expectations, clients often have limited experience with XR, making it difficult for them to visualize intended outcomes and anticipate production requirements and costs. Even during onsite meetings, producers face challenges in jointly discussing XR content, as clients wearing head-mounted displays do not share the same viewpoint as producers explaining the experience from outside the headset. Under these conditions, vision misalignment can emerge early in the process, leading to misunderstandings and costly revisions later in production.

Effective remote professional collaboration requires establishing common ground between stakeholders, even if they have different expertise or understanding of the discussion point [3, 12]. During XR production, this type of client-producer collaboration differs from internal work, where team members can use VR headsets together. While research shows shared visual context improves remote collaboration [5, 6], most client-facing tools remain 2D, creating a fundamental mismatch for discussing spatial XR concepts. Prior Social XR research has examined professional collaboration - including asymmetric collaboration [7], remote assistance [13], task instruction [8], and co-design [10] - yet these studies focus on task execution, skill transfer, or collaborative creation. Less explored are early-stage client-producer meetings where the goal is negotiating project scope and vision rather than producing the deliverable itself.

To explore whether a shared immersive space may support reducing the communication gaps and effective collaboration in XR pre-production stage, we examine Social XR as a meeting environment where both producers and clients situate within a shared three-dimensional space. Using an in-the-wild approach [2], we situate pre-production meetings within XR, allowing both parties to experience the medium they are discussing. This parallels VR Go-along methodologies [15, 17], which have shown that situating research activities within the relevant spatial context brings richer insights. In-the-wild VR studies have proven valid and valuable across various contexts [11, 16, 19].

We present findings from an in-the-wild study involving paired XR producers in Denmark and museum curators in the Netherlands (N=8), who conducted remote pre-production meetings inside a shared Social VR environment. Rather than using avatars, participants were captured in real time and represented through 3D point-cloud self-representations, enabling natural embodied

[1] Zoom: https://www.zoom.com/
[2] Miro: https://miro.com/
[3] Figma: https://www.figma.com/



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interaction and discussion [20]. Through observation of meeting interactions and post-session interviews, we examine how Social XR shapes communication and shared understanding during early XR project discussions, examining how Social XR shapes communication dynamics and what constitutes successful pre-production meetings.

The core contributions of this work are threefold:

- An in-the-wild study of Social XR pre-production meetings with XR producers and museum curators conducted from their respective professional environments;
- Empirical demonstration of how Social XR supports both stakeholders: clients gain spatial understanding of XR concepts, while producers observe client reactions in real time;
- Discovery that producers and clients have divergent meeting intentions (observation vs. exploration) with implications for professional collaborative XR environments.

2 In-the-Wild Study: Social VR Pre-Production Meetings

We conducted an in-the-wild study to observe how clients and producers experience and navigate Social XR as a meeting and ideation space during the pre-production stage. We invited producers from an XR production studio and clients from a museum to discuss potential XR project collaboration in Social VR, just as they would do in a Zoom or F2F meetings.

2.1 Setup and Participants

The study was conducted simultaneously at two locations: NISV (The Netherlands Institute for Sound and Vision) in the Netherlands (Figure 2), and Khora (VR/AR production studio) in Denmark. We ran four paired client-producer meetings (N=8) where client-role participants joined from the Netherlands and producer-role participants from Denmark. After each VR session, researchers conducted one-on-one interviews. Since both researchers were in the Netherlands, the interviews with participants in Denmark were via Zoom. We recruited a local assistant in Denmark to ensure seamless communication. Each session lasted approximately 40 minutes.

Four client-role participants: age (M=41.8, SD=11.4), gender (2f, 2m), professional experience (M=9.8, SD=3.1 years), XR experience (novice=2, knowledgeable=2, expert=1, self-reported). Four producer-role participants: age (M=33.8, SD=4.6), gender (1f, 3m), professional experience (M=4.9, SD=5.5 years), XR experience (expert=4, self-reported). Participants in each session had not met beforehand.

The application was built on VR2Gather [18], a Social VR system representing participants as point-cloud self-representations (Figure 1, center). The meeting environment, developed in Unity by Khora , included an interactive world map visualization providing a plausible context for discussing potential XR applications.

2.2 Procedure

Researchers introduced participants individually, explaining that they would meet in Social VR to discuss XR project ideas. Participants signed a consent form and completed a demographic form. Producer-role participants were asked to lead conversations as if conducting kick-off meetings with a prospective client visiting their company, showcasing capabilities and guiding ideation. Clients were asked to approach the discussion as museum representatives exploring potential XR collaboration.

Figure 2: System setup at the museum, showing the client participant (curator) wearing a head-mounted display and being captured by cameras for real-time pointcloud representation.

Both participants wore VR headsets and met in their point cloud representations for 10-20 minutes. Producers guided meetings by showcasing the Social VR application, explaining their company's capabilities, and leading the ideation. We didn't provide guidance on the duration of the meeting; the VR experience ended when the natural flow of discussion between participants ended. Following VR sessions, researchers conducted semi-structured interviews with participants individually, covering general experience, comparison with conventional formats, and evaluation of Social XR platform as a communication space (see Table 1).

2.3 Analysis

All sessions were video-recorded; interviews were audio recorded and transcribed using Dovetail[4]. The researcher reviewed video recordings to complement observational notes. Analysis followed an iterative, inductive coding approach [1]. After familiarizing with transcripts, insights were tagged and clustered into four themes (Section 3), which were refined through multiple rounds. Participant quotes are labeled as clients (C1–C4) and producers (P1–P4).

3 Results

3.1 Experiencing Embodied Co-Presence Beyond 2D Meetings

Social VR offered a level of fluidity that traditional remote meetings could not provide. Seeing full-body movement beyond 2D screens, participants could "*interrupt each other easily* (C2)" without "*sharing and switching screens* (C1)" common in Zoom meetings. This environment allowed more natural behavior: *"You can walk around and take distance because you are still around each other. While in Zoom, you're pretty much stuck to a screen and feel like apologizing when you step out for a minute"* (C4). Seeing full-body gestures helped producers assess client reactions and needs intuitively: *"I could see*

[4]Dovetail: https://dovetail.com/

Table 1: Post-experience interview questions

Topic	Questions
General	1) How was the overall experience? 2) How did the discussion with the project manager (or curator) on this Social XR platform go? 3) Rate today's project discussion collaboration success out of 10, and why?
Compared to conventional formats	Reflect on one of your recent F2F or Zoom meetings in the pre-production stage, where you discuss the possible project direction with other partners. 4) How did the communication differ (such as how you show or discuss objects) between those experiences and today's experience? 5) Do you see any added value in today's experience? Does it solve any communication problems?
Evaluation and future directions	6) What are the opportunities and challenges of using this Social XR platform for project collaboration? 7) What features would you add to the current application to improve communication? 8-a) (*project manager only) Do you see another use case of the social XR platform during the XR production? 8-b) (*curator only) Do you see another use case of the social XR platform during the project meetings? 9) Today, you spent X minutes. How long is sufficient for the first project meeting on this platform?
Additional comments	10) Do you have any other comments to add?

that in her body… something I cannot see that clearly in a video call" (P1).

Participants reported a greater sense of presence and immersion, as if "*standing there together*" and having a "*face to face meeting*" (C2). C4 told the interviewer after the VR session: "*I forgot that you were here during the meeting.*"

The depth of information provided extended beyond *human behavior* to *content* being shared. This particularly benefited clients unfamiliar with VR, who often found it difficult to imagine effects from terminology or from "*pictures and videos of 3D assets*" delivered by producers: *"If I show you a picture of a black void where you can walk in a 2D screen, it doesn't mean anything. In VR, it can be very powerful"* (P4).

3.2 Social XR as a Shared Pre-Production Discussion Space

Starting the first meeting inside VR worked as an educational step for clients unfamiliar with XR. By experiencing the meeting in VR, clients could grasp what is possible in the medium: *"This is a great way to break down those barriers, especially with a client who doesn't understand the medium and is very new to them"* (P2).

Social VR provided value even compared to face-to-face meetings, as both producers and clients could share a viewpoint in VR. Producers were no longer outside *observers* watching the reactions of clients in their own isolated experience. They could track where clients looked, what reactions were elicited, and collect information on interests in real time. *"In a normal face-to-face meeting, I always try to put people in VR to showcase previous projects, but then that's an individual experience... This was nice to be able to actually stand and look at something together and take a standpoint from there"* (P3).

Most participants (C1, C3, C4, P1, P2, P4) noted Social VR's potential for providing richer, clearer feedback since they were already *in-context*. Instead of pointing at 2D screens of filmed VR experience, they could walk towards or inside objects, touching and grabbing them, make sounds, and even demonstrate envisioned gestures at human scale.

P4 envisioned that Social XR could increase contract likelihood by introducing VR templates as starting points. They imagined framing discussions as *'OK, this is what we have now. What extra do you want? Let's talk about the next step,'* describing this approach as "a very powerful way to sell a project."

3.3 Divergent intentions in XR Pre-production meetings

Comparing interview responses and observed behaviors across roles revealed divergent intentions during meetings. Producers focused on observing client reactions to understand needs, considering client immersion as an indication that the experience was convincing: *"I just want them to feel immersed inside the experience, and then tell me how they feel and what they want with that"* (P1). While clients wanted to see more and interact more with the environment, producers were often cautious about when and what to show: *"The challenge is when you are standing in front of something very visual - that is naturally the direction that the client's mind will go in. I'd like to fill the person out a bit before I choose what to show"* (P3).

3.4 Experiential constraints of the Social VR setup

One critical limitation was that headsets obscured faces and eyes. Since facial expressions are one of the non-verbal cues in conversation, this could hinder building rapport or reading nuance, especially when meeting someone for the first time: *"I couldn't see her face clearly. So I don't know her reactions, her facial reactions to what I said"* (P1).

Participants expressed contrasting views on the comfort of wearing a VR headset for work meetings. C3 noted that *"the headset was not really comfortable,"* whereas C4 was positive: *"It was quiet enough to hang around for a longer period of time... you are not stuck to your chair or one spot."* Regardless of the opposing sentiments, both imagined staying in the space for up to *45 minutes*.

The *special setup* required for real-time volumetric capture - three cameras per person plus headset - was another limitation: *"It is not something that everyone has in their room or in their office"* (P4). However, once installed, this one-time effort could prevent unnecessary travel for the remaining production process.

4 Discussion

This study examined Social XR as a meeting context for early-stage XR collaboration between clients and producers who differ significantly in XR expertise and understanding. By situating both parties within a shared immersive environment, we investigated whether VR as a meeting medium could address communication gaps identified in prior work [9].

A key insight is that role asymmetry in pre-production meetings involves not just expertise difference but divergent intentions - a dynamic that was not visible in our earlier focus group study [9]. Producers approached meetings observationally, assessing reactions and controlling information flow. Clients approached exploratorily, wanting to see more and understand possibilities. While both share the ultimate goal of successful collaboration, their immediate meeting strategies differ based on their professional roles and stakes in the outcome. This suggests that effective pre-production meeting space may need to consider and support both intentions and needs.

The value of Social XR lies in enabling shared spatial reference with embodied co-presence. Prior research has examined professional collaborative contexts, including asymmetric collaboration [7], remote assistance [13], task instruction [8], and co-design [10]. Our work examines this in the context of early-stage creative collaboration between XR producers and clients, where producers could observe client attention and reactions within a shared environment.

Although the study benefits from inviting experts in their fields, the role-play setup often created moments of awkwardness and uncertainty during the sessions. Not all producers were directly involved in developing the showcased application used during the experiment, which limited their confidence and ability to provide a detailed explanation during the meetings. Inviting multiple producers was a deliberate decision to prioritize participant diversity; however, having a single experienced producer might have supported more consistent and in-depth discussions with the client participants. As the meetings were in a hypothetical setting, the conversation remained relatively shallow without real project contracts or budget negotiations. In addition, having a single demo environment also constrained exploration when the content didn't align with client interests, unlike conventional meetings, where producers present multiple prior projects. Overall, these observations suggest that both the role of producers and the availability of diverse reference examples are important considerations for future studies of Social XR pre-production meetings.

Based on these findings, this work raises broader questions about the evaluation of XR pre-production meeting success. What constitutes a "successful" meeting, whether early vision alignment, mutual understanding, or final project results, remains an open question. Addressing these questions will be essential for designing and assessing Social XR systems that support XR collaboration beyond early exploratory stages.

5 Conclusion

This study offers early empirical insights into how Social XR can function as a pre-production meeting space for XR collaboration. Our findings demonstrate that Social XR supports both clients and producers in distinct ways: clients gain direct spatial understanding of XR concepts, while producers can observe client reactions and guide discussions in real time. At the same time, our study reveals that professional role asymmetry persists in shared immersive environments: producers focus on observing and controlling information flow, while clients seek exploration and understanding. Effective Social XR meeting spaces should support both stakeholder's divergent intentions while facilitating their shared goal of establishing productive collaboration. How to measure meeting "success" when outcomes are not quantifiable task performance remains an open question for future research.

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