

Resonix: Prototyping VR for Fostering Remote Collaboration in Sound Art Curation

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Abstract

Sound art is an emerging and critical field in contemporary art that challenges traditionally visually dominated practices by integrating sound into participant experiences in exhibitions. However, interviews with curators and artists have revealed significant challenges in enabling efficient remote collaboration across locations. These challenges include providing an accurate understanding of spatial auditory effects and ensuring high flexibility in controlling their presentation. This study developed RESONIX, a VR-based solution that incorporates four core features: a modular simulation toolkit, a sound spatial display, a sound-time manager, and a role manager. These features aim to enhance remote collaboration in sound art curation. Preliminary user testing revealed that, while RESONIX requires more time compared to traditional online meeting, it significantly enhances collaborative audio control and editing, improves

the fidelity of audio experiences in remote settings, and optimizes sound-based curation workflows. These findings lay a foundation for further refinement and large-scale validation of the system.

CCS Concepts

• **Human-centered computing** → **Virtual reality**; **Interaction design**; **Interactive systems and tools**; • **Applied computing** → **Arts and humanities**.

Keywords

Virtual Reality (VR), Remote Collaboration, Sound Art, Curating

ACM Reference Format:

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1 Background

In curating art exhibitions, collaboration between artists and curators is crucial. Artists create artworks that captivate audiences and express their visions, while curators interpret these intentions and craft narratives that engage viewers with the artworks. Traditional

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curation methods often involve significant on-site operations and face-to-face communications, such as determining the placement of artworks, designing audience experiences, and adjusting various interfaces. These processes are time-consuming and resource-intensive and lack the flexibility needed for today's globalized and cross-regional collaborations. [2, 20]. The increasing diversity of exhibition formats and audience demands has also significantly increased the complexity of curation tasks. [7, 19].

Sound art is a contemporary artistic medium that uses sound as its primary material or medium. Unlike purely visual art forms, its distinctive auditory effects have gained increasing public attention, leading to a significant increase in exhibitions in museums and galleries dedicated to sound art [8]. Creating an impactful auditory experience in sound art requires consideration of numerous factors, one of which is the specific spatial conditions needed to achieve the desired effect [3, 24]. For example, some installations must be placed in carefully selected spaces to allow sound to propagate and reflect, generating unique acoustic effects [15], such as Janet Cardiff's *The Forty Part Motet* [6] (see Figure1(a)). This imposes higher demands on exhibition design, requiring curators to meticulously plan spatial layouts and select suitable sound equipment.

Beyond traditional sonic expressions, sound art often integrates multimedia elements such as video, lighting, and interactive installations, creating immersive, multisensory experiences [18]. This trend introduces new forms of expression for sound art while also increasing the complexity and challenges in curation, which interact with audio and visual installation that the *Daydream V.02* is a typical instance [1, 26] (see Figure1(b)). Curators and artists must therefore design auditory environments that maximize sensory engagement and fully immerse the audience in the experience of sound art [22]. Additionally, the complexity and diversity of sound art emphasize the need for strong collaboration between curators and artists. For example, Zimoun's kinetic installations—featuring motors, ropes, and wood—require precise collaboration to synchronize technical components, materials, and spatial configurations for optimal sound production [13] (see Figure1(c)). This collaboration involves close communication throughout the creation and exhibition planning stages [10].

Virtual reality (VR) offers innovative solutions to many of these challenges. It has been widely used in fields such as education, healthcare, and architecture for tasks such as remote collaboration and simulation, creating immersive environments where users can interact with digital objects [12, 17, 21, 27]. In the context of curation, VR has demonstrated its potential to enhance audience engagement. For example, some museums have adopted virtual reality for virtual exhibitions, allowing audiences to explore artwork through digital devices, breaking geographic barriers, and providing richer, more immersive experiences [16, 23]). Despite its promise, the use of VR in sound-based curation collaboration remains an underexplored area. Recent studies have explored the application of VR in sound research; however, much of the existing work focuses on supporting underrepresented individuals who are deaf or hard of hearing or emphasizes sound as a critical sensory modality beyond vision [5, 14]. Consequently, developing VR tools specifically tailored for remote collaboration in sound art curation could significantly enhance the efficiency of interactions between curators and artists, addressing a critical gap in this field.

These tools should not only prioritize creating immersive auditory experiences, but also consider the interplay between sound and other elements, such as form and space, to meet the diverse and multifaceted collaborative needs of curators and artists.

In this paper, we first conducted semi-structured interviews with eight sound exhibition professionals, including four curators and four sound artists. Based on the insights gathered from these interviews, we developed *Resonix*, a pre-built VR template created using Unity and Meta Quest devices. *Resonix* is designed to assist curators and artists in sound art curation and remote collaboration through four key features: modular simulation toolkit, sound spatial display, sound-time manager, and role manager. Subsequently, we conducted a preliminary comparative user test to evaluate the feasibility of this prototype. The test compared traditional whiteboard-based remote video conferencing with the VR solution for sound art curation. Results from the user test indicate that while the VR solution is relatively time-consuming, it significantly enhances curators' and artists' understanding of the artwork, facilitates the timely identification of issues, and improves collaboration efficiency. These make the VR solution particularly suitable for the mid-stage of the curatorial process.

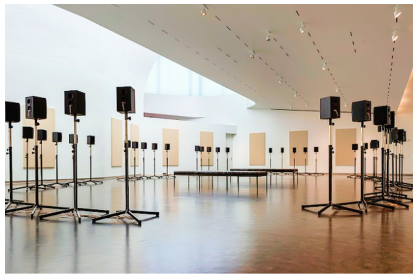
2 User Study

2.1 Semi-structured Interview

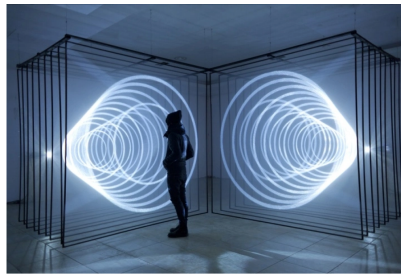
This study conducted semi-structured interviews with sound artists and curators to gain in-depth insights into the common forms of expression and focal points in sound art, the related curation workflow, and the potential collaboration barriers between curators and artists.

2.1.1 Participants. The recruitment process was primarily carried out through the authors' direct or indirect personal connections ($n = 8$), including 4 curators and 4 sound artists to reflect the key collaborative needs from both perspectives. (see Appendix A for the demographic information). All curators had at least two years of professional experience, a deep understanding of sound art, and experience curating sound art exhibitions. The sound artists selected were between 18 and 35 years old and actively involved in the field of sound art, with different forms of art presentation. Prior to the interviews, each participant signed an informed consent form. The interviews were approved by the local university's ethics committee, and each participant received 30 dollars as compensation for their time.

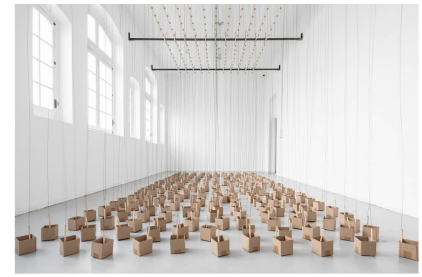
2.1.2 Interview Structure. The interviews were conducted remotely in August 2024, with each lasted approximately 40 minutes (see Appendix B for the complete list of interview questions). For curators, the questions primarily covered their professional experience, particularly in sound art, the processes they follow when curating sound art, the similarities and differences between curating sound art and other art forms, potential issues that may arise before and after exhibitions, and their preferred strategies for attracting and educating audiences. For artists, the questions focused on their motivations and work experience in the field of sound art, the forms and exhibition methods of their works, the subtle differences presented by their works in different environments and the challenges



(a) The Forty Part Motet



(b) Audio/Visual Installation Daydream V. 02



(c) Zimoun's Kinetic Installations

Figure 1: Three Voice Art Installation Examples for Related Works ©Credit by authors.

they faced when communicating with curators and audiences; additionally, both groups were asked about their views on VR solutions.

2.2 Thematic Analysis

For thematic analysis, the researchers followed Braun and Clarke's six-step process [4, 9, 25], where two different researchers independently coded the texts and then organized the codes into core themes. Subsequently, a third moderator was invited to discuss until consensus was reached, and finally, a coding manual was developed. To ensure the accuracy of the data, a consensus meeting was organized, resulting in an agreement rate of approximately 80 percent between the two researchers. The thematic analysis resulted in three themes: 1) Different Perspectives of Curators and Sound Artists; 2) Multiple Forms of Sound Expression; 3) The entanglement of sound with time and space.

2.2.1 Different Perspectives of Curators and Sound Artists. This category includes two themes, focusing on the general practice directions and specific technical aspects of sound art. Most artists (3/4) tend to emphasize the direct experience of sound in their actual creations (see table 2 No. 1-3). In contrast, some curators focus on the conceptual nature of sound art, which is effective for defining themes and selecting works for exhibition; they also pay great attention to the relationships between these works (see table 2 No. 4-5). This reveals that curators and artists have different perspectives. Curators tend to think from a macro perspective, building the logical framework of the exhibition from a conceptual standpoint. In contrast, artists prefer to view their works from a micro perspective, considering whether their work creates a direct experience and whether the audience can feel it.

2.2.2 Multiple Forms of Sound Expression. On one hand, sound itself possesses a rich array of attributes. Artists have a strong grasp of this richness of sound. For instance, there are natural sounds that occur in the environment and synthesized sounds created through technology. Different materials and spaces can also shape distinct timbres. Curators also have necessary understanding of these attributes (see table 2 No. 6-7).

Another aspect is the integration of sound with other art forms. Sound art is no longer confined to sound alone but is enriched through the integration of visual arts, theatre, and other media. From observations, some artists focus on the interaction between sound and vision, which is mentioned most frequently. They believe that there is a natural connection between the two (see table 2 No.

8-9). The relationship between sound and live performance is also mentioned frequently (see table 2 No. 10).

These themes reveal the close relationship between sound art and other media, pointing out how artists collaborate across disciplines to enrich the expression of their work. This calls for curation tools that support the integration and display of multiple media.

2.2.3 The entanglement of sound with time and space. Many sound art pieces are inherently related to space, especially in terms of form and narrative (see table 2 No. 11). Some curators emphasize the importance of space from a narrative perspective (see table 2 No. 12). Both curators and artists frequently mentioned the issue of sound interference (see table 2 No. 13-15). Of course, some curators have also mentioned challenges in the late stages of curating that cannot be resolved through remote collaboration (see table 2 No. 16).

3 VR Prototype

Based on the results of the above interviews, we have created a VR remote curation prototype for sound-based curating, specifically addressing key issues in collaboration between curators and sound artists. It includes four solutions: 1) modular simulation toolkit, 2) sound spatial display, 3) sound-time manager, and 4) role manager. Among these solutions, the modular simulation toolkit was inspired by the theme of "Multiple Forms of Sound Expression". The sound spatial display and sound-time manager were inspired by the theme of "The entanglement of sound with time and space". The role manager was inspired by the theme of "Different Perspectives of Curators and Sound Artists".

3.1 Solutions

3.1.1 Modular simulation toolkit. This is a modular toolkit designed for sound simulation, enabling users to actively generate and modify sound effects. This category includes tools for creating physical sounds (such as tapping, vibrating, and colliding), generating electronically synthesized sounds (audio mixer) and setting up general spatial sound effects in the environment.

In order to create physical sounds, we developed a script called Velocity Estimator. The primary function of this script is to estimate the velocity (both linear and angular) of an object at the moment of impact, providing a smooth velocity estimation value, which allows us to simulate the magnitude of impact sounds. Additionally, we selected three basic materials: metal, wood, and stone. Each

material has its unique acoustic properties, which can be set through controllable parameters. Therefore, the final sound is determined by the type of action (especially impact), velocity, and the materials of the impacting and impacted objects; by adjusting these parameters, we can highly simulate physical sounds. This design is scalable, allowing for the addition of more materials and parameters to simulate more complex sound effects. For example, materials such as glass and plastic can be added, or parameters like environmental noise and reflection effects can be included. As for electronic sound synthesis, we created a simple sound synthesis simulator based on resources from the Unity Asset Store for reproducibility, which can be used to synthesize sounds. This resource is also modular, capable of synthesizing sounds ranging from simple to complex.

Regarding spatial sound, we built a template featuring a movable spherical spatial sound source, as well as a function that allows users to construct spatial walls. Through this tool, users can freely manipulate the parameters of the sound source and space to achieve dynamic and realistic spatial audio representation. These two features are mainly designed to simulate two of the most important characteristics of sound: Distance Attenuation and Spatial Occlusion [11]. As the movable sphere moves through space, Distance Attenuation affects the perceived loudness of the sound in your ears, thereby helping your ears to localize the sound source. Additionally, Spatial Occlusion comes into play when the sound source is partially or completely obstructed by an obstacle, altering the sound's propagation path, which is the role of the spatial wall.

3.1.2 Sound Spatial Display. The Sound Spatial Display is used to process spatial location information of sound, including a mini sound map, and displays that hang on the artworks themselves, to represent information about the position, type, characteristics, and dynamic changes of sound sources.

The mini map primarily indicates the comprehensive situation of those sound sources. Based on the conclusions from the Modular Simulation Toolkit, we categorize sounds into five types: sounds from live performances operated by humans, recorded sounds, sounds generated by physical movements of devices, digitally synthesized sounds, and mixed sounds. Each type is represented by a different color, and they are all displayed in the form of circles distributed in the map. Surrounding these circles are dynamically changing "rings" that visualize the current loudness of the sound by dynamically changing their size—the ring expands when the sound is louder and contracts when the sound is quieter. These "rings" are presented in the form of particles, which bounce off the walls when they collide with them, and their motion changes when particles collide with each other. This allows for real-time observation of the dynamic changes of sound in space. Through these, users can have a bird-view to read out the quality, distribution, and interrelations of spatial sounds.

The display on the object is a suspended indicator above the sound artwork when a person approaches a sound. On one hand, it is presented as a sphere with the same color as in the mini map, and the radius of this sphere changes according to the loudness. On the other hand, it has a text label indicating the characteristics of the object, such as "motor vibration sound from Device A." This method facilitates detailed information about individual sounds from a perspective view.

3.1.3 Sound-Time Manager. The Sound-Time Manager consists of two sub-functions: segment recording and the timeline. The segment recording feature allows artists and curators to take sound-based snapshots with playback capabilities. We propose a method to facilitate collaboration between the two, especially asynchronous collaboration, where the curator and artist do not enter the same period. The person who enters later can understand the project modifications based on the recordings made by the former. These recordings not merely include sound but are a blend of sound, vision, and time. Specifically, when a user starts segment recording, it does not record flat video but records the 3D states before and after modification, with each state containing dual changes in the visual and auditory aspects of the installation. Later users can switch between these two states to observe the modifications within the broader context and determine if they meet expectations. All edited objects are outlined in red to alert subsequent viewers. Additionally, textual annotations can be made at the beginning and end states to provide more specific explanations of the modifications.

Regarding the sound timeline, this is designed for scheduling within the exhibition. Playing multiple sound installations simultaneously can cause interference between sounds, so it is necessary to plan the playback time slots for each. On this timeline, various sound time slots can be edited, and these time slots are visually consistent with the markers on the mini sound map to facilitate simultaneous observation of their spatial attributes. This is because if two installations are close in space, or if a particular installation is in an open space, have overlapping playback time slots with other installations are not expected.

3.1.4 Role manager. The Role Manager is a tool for identity switching and permission settings. Before entering the VR environment, users are required to select their role, whether as a curator or an artist, or both. In terms of permissions, curators and artists have different levels of access to various functionalities, with specific authorizations needed to activate certain features. On the Sound Spatial Display, curators have the freedom to turn any sound on or off at will, while artists are only permitted to open or close the sound of their own works. Regarding the Sound Timeline, curators have full management capabilities, allowing them to adjust the playback time slots for any piece, whereas artists are restricted to viewing the timeline and making requests to the curator for changes to their own work's timeline. However, artists have full control over the details of their own works, including both visual and auditory aspects. Curators, on the other hand, are expected to respect the integrity of the artists' works, with permissions limited to viewing and commenting. Additionally, to prevent curators from interrupting artists while they are editing their works, an editing zone will be established. During the editing period, an artist's work is visualized as an editing area to others, which means the work cannot be interfered with by the curator's actions.

3.2 User Testing

3.2.1 Setup and Participants. In this study, two experimental conditions were established. The control group employed conventional online meetings and whiteboard-based collaboration, whereas the experimental group utilized our developed VR tool. Both groups were required to complete identical curatorial tasks, which included

discussing the exhibition theme, planning the spatial layout, and evaluating the sound performance of the artworks. By comparing these two conditions, we aimed to assess the effectiveness of the VR tool in facilitating early-stage curatorial collaboration and preview, as well as to gather potential improvements. A total of 14 participants were recruited and assigned to the two groups, each comprising one curator and six artists. Their ages ranged from 23 to 35 years. Some had prior experience with VR, while others were entirely unfamiliar with it. All participants possessed at least some background in curation or artistic creation to ensure they could offer informed professional feedback throughout the experiment.

3.2.2 Procedure. The experiment comprised three primary stages: introduction, task execution and collaboration, and post-study interviews. First, the researchers provided all participants with a detailed explanation of the study's objectives, procedures, and pertinent precautions, and ensured they became familiar with the tools designated for their respective groups. Subsequently, the participants engaged in curatorial discussions and assessed the audio performance of artworks; the control group relied on verbal communication and handwritten documentation, while the VR group conducted immersive previews within a virtual environment. Finally, both qualitative analyses were conducted based on the post-study interviews.

3.2.3 Result. The experimental data indicate that the VR group outperformed the traditional group in terms of overall communication efficiency, accurate prediction of exhibition outcomes, and reduction of rework. Most participants reported that the multi-dimensional spatial perspectives provided by the virtual environment (including top-down and god's-eye views), as well as real-time audio simulation, allowed them to more intuitively understand the interactions between artworks during the early curatorial stages, thus minimizing misjudgments regarding the outcomes of the physical setup. As one sound artist noted, "The ability to hear and see how sound travels and bounces in the virtual space gave me a much clearer understanding of potential acoustic masking that would occur in the physical exhibition. This simply isn't possible with floor plans or verbal descriptions." A curator similarly emphasized, "Pre-installation in a virtual space helps me identify details that may have been missed until the physical installation"

In contrast, the traditional method primarily relied on textual or verbal descriptions, which made it difficult to detect layout and audio issues in a timely manner, resulting in a higher frequency of communication and revisions. One participant explicitly stated, "The traditional method was far less effective at predicting acoustic interactions. We had to rely on abstract descriptions and imagination. What seemed clear in our planning meetings often failed to translate accurately to the actual exhibition space."

The traditional method's iteration speed was fast, and it was more suitable for the initial phase, whereas the VR method was more suitable for the middle stage of curation. As expressed by a participating curator, "We found that quickly sketching initial concepts worked better with traditional methods, but once we needed to make precise spatial and temporal decisions about sound placement, the VR environment became more effective."

During the interviews, most artists mentioned that the VR tool helped them quickly explore various exhibition configurations, thereby shortening decision-making time. One artist elaborated,

"I could test how my spatial-based sound piece would interact with neighboring installations from multiple positions in the space. This dimension is something we've never been able to accurately predict before." Curators also emphasized that immersive previews effectively reduced the cost of changes during the exhibition setup phase.

However, some participants pointed out the limitations of VR in terms of hardware compatibility, learning costs, especially for older participants or those unfamiliar with VR, who required additional training or technical support. Additionally, participants suggested several improvements, such as laser pointing and mini-map teleportation, to facilitate precise marking or rapid movement within large virtual spaces. They also expressed a desire for a more intuitive representation of acoustic interference or interaction effects between different artworks.

Overall, this study demonstrates the advantages of the VR curatorial tool in the early to mid-stage planning and communication of sound art exhibitions. Future work will focus on continuing to refine system functionalities to further enhance its applicability in the professional field of sound curation.

4 Discussion and Conclusion

In conclusion, the research first used semi-structured interviews to reveal major challenges in the curatorial process of sound art, including the complexity of sound produced by the interaction of materials with space, the conflicting curatorial priorities of curators and artists, and the soundscape interference (both temporal and spatial) resulting from the simultaneous exhibition of multiple works. To address these challenges, we designed Resonix, a prototype toolkit that includes modular sound simulation, sound spatial display through minimap and indicators, sound timeline management, and role management. To assess this solution, a comparative experiment was conducted with sound art artists and curators, using whiteboard-based online meeting and Resonix, thus validating the prototype's usability. Overall, it fills the gap in the intersection between sound art curating and VR remote collaboration, providing valuable direction for the study and implementation of technologies in this field.

This tool offers a clear and convenient lightweight solution that offers significant advantages over work on location sound art curation in terms of sound visualisation management, exhibit performance time management, and division of labour for remote collaboration. Since the tool is still in the early stages of prototype development, its sound simulation capabilities—particularly with regard to precisely mimicking physical and electronic synthesized sounds—only a limited selection of sample sound effects has been supplied at present. The present version is built using Unity, and it supports direct import of visual and audio source files, but it lacks compatibility with interactive source files like Max/MSP and TouchDesigner, and will intend to resolve this matter in future releases.

In the future, the tool will be further developed to improve its audio simulation performance, particularly in more accurately replicating complex sounds produced when physics and space interact. Provide additional functions for importing files and audiovisual

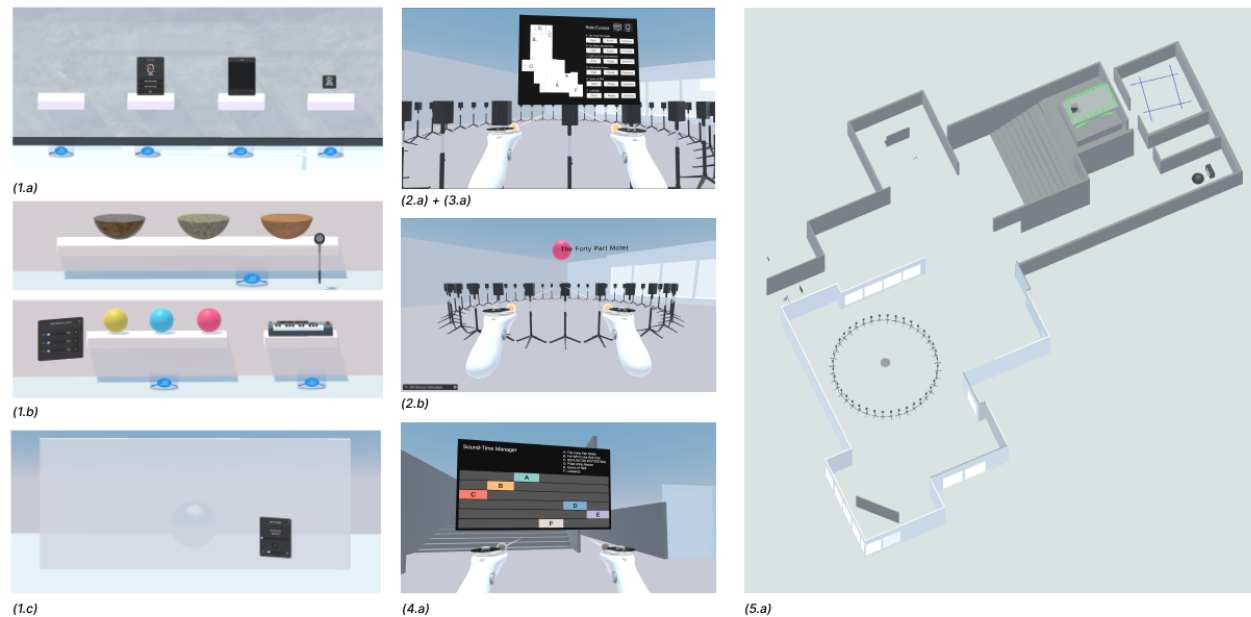


Figure 2: (1) Modular simulation toolkit: sound recording and debugging tools (1.a), physical sounds simulation (1.b), and spatial sound simulation (1.c); (2) Minimap (2.a); The display hang on the object (2.b); (3) Role manager (3.a); (4) Sound-Time Manager (3.a); (5) User Testing on curation (5.a) ©Credit by authors.

interaction to allow artists to port their work to the platform accurately and abundantly. In addition, large-scale user testing will be conducted after prototype optimization to refine its usability and effectiveness. It is also promising that this VR collaborative curatorial approach can be expanded to other sound-related fields, such as sound-related cultural heritage restoration or live music performances and provide reference solution to enhance the participation and experience of disabled groups who are unable to attend the site in sound art. At the moment, we believe this work to be a contribution for artists, curators, and researchers to broaden the potential of sound art to create interactive and attractive exhibitions.

Acknowledgments

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A Appendix A (Table 1)

B Appendix B: Semi-structured Interview

B.1 FOR ARTISTS

- (1) Artist Background
 - (a) Where have you been educated? What's your main focus?
 - (b) Could you tell us about your experience as an artist? Where have your works been exhibited?
- (2) Experience and Knowledge in Sound Art
 - (a) What is your understanding of sound art? Could you briefly describe the forms and characteristics of your sound art works?
 - (b) Do you take into account the subtle differences in how your sound pieces are experienced in different exhibition environments? If so, how do you adapt to these changes?
- (3) Communication with Curators and Audiences
 - (a) What do you usually communicate with the curators about the specifics of the exhibition? Are these discussions usually remote or on-site?
 - (b) What challenges have you encountered when communicating with curators or audiences? And how do you address these communication challenges?
- (4) Attitudes Toward VR
 - (a) Do you think VR could be a potential solution for showcasing your sound art remotely? Why or why not?
 - (b) What are the pros and cons of using VR for remote presentation and audience interaction with your work?

B.2 FOR CURATORS

- (1) Experience as a Curator
 - (a) Could you briefly introduce your experience as a curator? What exhibitions have you curated?
 - (b) Where have you been educated? What's your main focus?
- (2) Experience and Knowledge in Sound Art

- (a) What is your understanding of sound art? How do you think sound art stands out compared to other art forms?
- (b) In your opinion, what are the main differences between curating a sound art exhibition and other forms of art exhibitions?

(3) Curatorial Approach and Workflow

- (a) If you were to curate a sound art exhibition, what curatorial methods would you typically use? Could you describe the full process, from the concept to preparation and implementation?
- (b) How do you decide on the presentation format of the artworks in a sound art exhibition?
- (c) How do you consider the audience experience when curating a sound art exhibition? In your view, how does the audience experience differ between sound art and other types of exhibitions?
- (d) How do you balance technical considerations (such as sound equipment and acoustics) with the conceptual goals of the exhibition?

(4) Attitudes Toward VR

- (a) Do you think VR could be a potential solution in curating exhibitions? Why or why not?
- (b) What are the advantages and limitations of VR in remote curation of sound art exhibitions?

C Appendix C (Table 2)

D Appendix D: Post-study Interview

D.1 FOR ARTISTS

- (1) Communication Mode
 - (a) During the course of this experiment, do you feel that you were able to clearly understand the curator's intentions? Could you share specific experiences or examples that illustrate this?
 - (b) Do you believe the tools used in this experiment were effective in helping you express your creative ideas? Could you provide any examples to support your view?
- (2) Communication Efficiency
 - (a) Do you feel that the tools employed in this experiment allowed for faster expression and reception of information? Could you share specific instances where you felt this was the case?
 - (b) In your opinion, did the tools used in this experiment help to stimulate your creative inspiration? Could you provide examples of how this occurred?
- (3) Interaction Experience
 - (a) How would you describe your overall experience in this experiment? Do you think it was beneficial to your work?
 - (b) During the experiment, were there any particular interactions or features that you found more comfortable, natural, or easier to use? Please elaborate.
 - (c) Do you have any suggestions for improving the tools used in this experiment?
 - (d) Would you be willing to use the tools from this experiment in your future work? Would you recommend them to others?

Table 1: Participant Expertise Overview

ID	Identity	Experience (Years)	Expertise Keywords
P1	Artist	3	Sound Installation, Instrument Design, Radio Art
P2	Artist	6	Signal Transformation, Spatial Audio
P3	Artist	4	Audio-visual Interaction, Electronic Music Synthesis
P4	Artist	3	Audio Narrative
P5	Curator	2	Anime Expo, Music Live Performance
P6	Curator	7	Sound Performance, Sound Installation, Land Art
P7	Curator	11	Music Live Performance, Sound Director
P8	Curator	2	Sound Installation

D.2 FOR CURATORS

(1) Communication Mode

- (a) During the course of this experiment, do you feel that you were able to clearly convey your intentions to the artists? Could you share specific experiences or examples that demonstrate this?
- (b) Do you think the tools used in this experiment were effective in helping you understand the artists' feedback and creative direction? Could you provide any examples?

(2) Communication Efficiency

- (a) Do you feel that the tools employed in this experiment allowed for faster expression and reception of information? Could you share specific instances where you felt this was the case?
- (b) In your opinion, did the tools used in this experiment help you understand the artists' interpretations of the

curatorial theme and their creative approach? Could you provide any examples?

(3) Interaction Experience

- (a) How would you describe your overall experience in this experiment? Do you think it was beneficial to your work as a curator?
- (b) During the experiment, were there any particular interactions or features that you found more comfortable, natural, or easier to use? Please elaborate.
- (c) Do you have any suggestions for improving the tools used in this experiment?
- (d) Would you be willing to use the tools from this experiment in your future work? Would you recommend them to others?

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Table 2: Quotes for User Study

No.	Participant ID	Quote
1	P2	"I think sound itself is a concept. There's no need for too much philosophical deliberation. I focus on aesthetics and the experience itself, rather than on concepts."
2	P3	"I don't enjoy discussing those abstract concepts with curators. I'm very focused on the experience—it's about something being fun, intuitively fun."
3	P4	"It's crucial to ensure that every detail is perfect, from the precision of the sound waves to the synchronization of audio elements."
4	P5	"For me, I usually start from the content, first set the theme, and then publicly announce the theme and venue, using an open call to solicit and select sound art projects."
5	P6	"In terms of the audience, I will consider the proximity of the audience to these installations or the sounds."
6	P7	"I teach at a university, and one of the topics involves wave field synthesis. One group used Max/MSP to design sound interactions and then build some movable walls."
7	P1	"For my graduation design exhibition, I showed a physical sound interaction installation. It consists of elastic strings that, when touched, change the voltage, thereby producing different sounds. This creates a tension field composed of space, physical elements, and sound."
8	P3	"I once saw a cognitive psychology experiment where you see a shape and corresponding music appear in your mind. It's a kind of intuition."
9	P6	"Beautiful painting is also a piece of music, or at least it contains elements that can be regarded as music."
10	P3	"I also engage in live performances related to electronic music, like DJ. I think a DJ is a curator, selecting dozens of music tracks in one night and processing them."
11	P1	"If I want to exhibit my work, I would pay great attention to the characteristics of the space, whether it is narrow or open because it affects the soundscape."
12	P6	"I focus on the characteristics of the site. For example, the large spaces of churches or narrow tunnels have different sound qualities, some of which may even tell you interesting stories."
13	P5	"I focus on managing space arrangements in large exhibitions to prevent sound pollution."
14	P3	"We address interference by setting different time slots throughout the day for different types of works to be played alternately."
15	P8	"To enhance the audience experience, we schedule specific times during the day for immersive sound installations to be active, allowing visitors to fully engage with each piece without distractions."
16	P8	"When there's a lot of physical interactive hardware involved, the handling of various powers can become very chaotic. But on-site, you can quickly become aware of these issues."