Playful Technology-Mediated Audience Participation in a Live Music Event

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Abstract

This paper presents the evaluation of playful technology-mediated audience participation (TMAP) during three music performances in a recent music event. It captures preliminary impressions from a wide range of perspectives and includes critical reflections of music artists, video analysis and qualitative interviews with audience members to cover hypotheses designed to capture both the artists' and the audience's point of view. Results indicate a willingness from both sides to engage in playful TMAP, and a high potential for exploration and playful collaboration within the audience, but the experience is restricted by the need to retain control on the side of artists and the need for clear instructions, feedback and reliable technical systems on the side of the audience.

Author Keywords

Technology-Mediated Audience Participation; Music Performance; Playful Interaction

ACM Classification Keywords

H.5.m. [Information Interfaces and Presentation (e.g. HCI)]: Miscellaneous; K.8.0 [Personal Computing]: Games; H.5.5 [Sound and Music Computing]: .

Introduction

This paper reflects playful technology-mediated audience participation (TMAP) in live music during a recent music event. Across three music performances and a supporting artistic performance technology was used to facilitate playful interaction between artists and audience. We focus on first impressions of the performance from the perspectives of participating artists and audience. We first describe the four performances along with giving a critical reflection from the perspective of the participating artists based on informal personal and email de-briefs. These perspectives are then contrasted by presenting preliminary results of a qualitative evaluation with audience members. To the left we present a series of hypotheses that define the research context of this work. Given that this is a work-in-progress paper, we will not validate these hypotheses but present first directions in which results are potentially leading.

Related Work

An example for audience participation goes back to Mozart (1756-1791), who allegedly composed the parts of the "Musikalisches Würfelspiel" [7] (musical dice game minuet). He made a quite conscious game design decision. He recognized chamber music as a participatory musical form in the need for an interactive diversion for the audience. Thus he introduced two dice, thrown to determine one of many possible combinations of musical segments of waltz music played afterwards. This playful approach seemed to represent the very antithesis of compositional strategies [9]. For this purpose Mozart abstracted waltz music from continuous pieces of music to smaller segments, which can be rearranged freely. The common denominator of many works in the field of sound art and music-based games [8], is that they make aspects of playing music and composition accessible to the audience by abstracting from its original complexity. The same is needed for playful TMAP. Previ-

ous work in this field has resulted in the creation of design cards to support creative processes in TMAP [4], metrics to describe and evaluate the characteristics of participatory performances [6], and design implications such as expressiveness, communication and appropriateness that are of concern to both audience and musicians in TMAP applications [3]. The research presented here will extend these foundations by evaluating three distinct music performances using TMAP.

Revisiting the Performances from an Artist Perspective

In this section we discuss the three performances and the supporting performance from the perspective of the participating artists. Each performance is first described and then critically reflected. The critical reflections are based on informal personal and email discussions with the artists.

Johannes Kretz - Robots

In this 20 minute-long opening piece, created by a composer and computer musician, the audience is introduced to the overall setting and general atmosphere of the event. An environment at the intersection of performance and installation offers the audience a space of exploration and discovery. The performance iStressTest for three robots and audience provided three autonomous interactive musical agents, each with its own musical personality, reacting to collisions with the wall or with the feet of the visitors, both visually and acoustically. The more the robots were hit, the more they were stressed, emitting "stress sounds" and also visually reflecting their stress level with different colours on the display. In order to achieve a common global soundscape, the robots transmitted their states to a laptop computer through WLAN, which allowed on the one hand to create a common acoustical atmosphere, and on the other hand allowed to synchronise the rhythmical patterns

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Hypotheses

(H1): Music artists welcome interactive systems for audience participation because it enables new ways of artistic expression.

(H2): Interactive systems for audience participation positively influence an audience's experience of a performance.

(H3): Artists perceive interactive systems for audience participation as a way of communicating with the audience.

(H4): Interactive systems for audience participation make the spectators feel included in the performance.

Breaking The Wall Event

The event was held as part of an art-based research project to put created systems for TMAP to a practical test and to evaluate their use with audience members and music artists. The event was held in Vienna on June 2nd, 2017. There were 288 attendants who took part in three music performances and a supporting artistic performance. All three performances used the same layout of the space (see figure 1). The stage (used in the Smartphones and Lasers performances) was positioned in the centre allowing the crowd to gather around it from all sides. Two video screens were placed on the floor and used in all three performances. Four pedestals with speakers were positioned close to the corners of the room and allowed attendants to interact during the Smartphones performance. The four moving head spotlights stood on the floor and were used in the Lasers performance.

of the robots. Synchronization could only happen, when the robots were in low stress level and "undisturbed" from the audience. The robots' movement information is also used to (relatively) operate a first-person character in a virtual, photogrammetric replica of the event's location displayed on two screens on the floor (figure 1). The position of the character adds auditive responses to the soundscape. So, the way the audience interacts with the robots dynamically affects the overall alternation of sound in a playful way, while the visual representation acts as a game-like interface intended for a multitude of users.

Critical Reflection
From a composer perspective – who is used to creating a work and to being able to accurately control the sounding result of a work – it was a challenge to create an environment, where the audience is capable of modifying the musical outcome interactively. In general the playful setup of the performance worked nicely. Groups of audience members spontaneously decided to surround / trap one of the robots and to play with it together within their circle. (This behaviour was not expected by the composer but nevertheless was an interesting and welcome result of the experiment.) It seemed not so clear for the audience, whether iStressTest was a "composition" or an interactive "funny situation" during the period of the audience entering the hall. This relaxed situation seemed to be welcome for the audience and they were able to decide individually, whether they wanted to chat with other visitors or whether they would involve themselves in the sound game. In any case the installation seemed to trigger interest and curiosity.

Electric Indigo - Smartphones
By using an app developed for this performance the smartphones of the attendees are transformed into mobile sound sources. On the one hand these can be manipulated in

real-time by the composer and musician, on the other they are freed of a static location-dependance by the behaviour and movement of the audience. This way the audience (as a swarm) is able to independently affect the distribution of sound thereby acting as a dynamic mediator between performer and performance space. This bridge is realised technologically through the use of ultra sound (high-frequency sound IDs) [5], which connects the audience's smartphones to the performer without the need to join a WiFi or mobile phone network, thus lowering the technological threshold for participation. The audience uses the app on their own smartphones. Based on inputs from the artist on stage the phones create sounds and blinking display lights. Audience members can also use four pedestals in the corners of the room (figure 1) to augment the sounds from their phones. The audience interacts by positioning their devices (and thus sound sources) in the room to co-create the resulting electro-acoustic soundscape.

Critical Reflection
Some of the files running off the phones were less audible than others, and the audience could be observed in their quest to understand the role of the equipment on the four pedestals. However, this created an atmosphere of wonder and excitement for many, and they continued to search for the "right" way to contribute the things happening on the phones to the overall performance. The artist, on the other hand, tried her best to make the inclusion of the sounds from the smart phones as noticeable as possible, with room to improve. Despite testing the app beforehand (under different conditions) some phones did not always react to the high-frequency audio triggers. This resulted in fewer phones playing back the audio files than desired. Still, as the modes of interaction were not perfectly transparent, many people seemed to think that this was a deliberate differentiation among the large number of smart phones. This
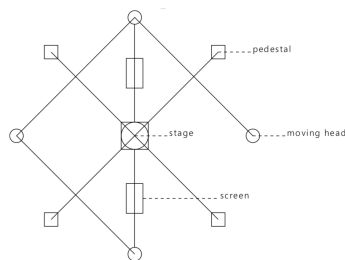
made them enjoy the moments when their own phones reacted. An additional aspect of audience participation was described by participants, as the music itself was modulated from moving around, so that through variation of their location and motion within the performance space made them interact with the sound in unexpected ways. Weaving through people who had their smart phone blinking and make sounds varied the experience from moment to moment, and it created a bond between participants.

The original plan was to add amplification possibilities for the phones at the four pedestals as an additional interaction feature for the audience. After the dress rehearsal on the day before the premiere, when more people were present than during the rehearsals before that, two problems with the amplification became visible: One being the quite natural tendency of people to try out the amplifying coils repeatedly which would result in harsh (and from the artist's side unintended), more or less rhythmical volume alternations of very loud and quiet. This became annoying and stressful for the artist as she had no adequate option to react to it in a way that would make sense musically. Second the operation of the amplification coils has a huge flaw: They produce amplified interference noises every time the coil is close to the phone but does not touch it. Therefore, in the morning of the day of the premiere, the artist decided not to use the coils for amplification of the phones but play the concert at lower volume instead.

null.head - Lasers
The collaboration with the performance artists null.head (Didi Bruckmayr and Chris Bruckmayr) focuses on the technological and dramaturgical connection of body, sound, light and room. Through this multi-sensory experience, the audience should be able to reflect on and question digital surveillance and technological authority as it may be part

of technology-mediated audience participation. This kind of embodied and technological intervention creates an experimental situation questioning accepted customs and habits. Technically, the audience will be located in the room with the use of laser traps scattered in the whole area. Thus the position of audience members in those traps becomes a characteristic parameter of the performance. Every time someone crosses an ankle-high laser barrier, a certain change in sound is initiated, while the moving head spotlights (figure 1) focus on this certain person.

Critical Reflection
Due to the unexpectedly large number of initial participants, too many laser tripwires were activated too often. So the interaction between audience and technology was a bit harder to follow than expected. Thanks to the performance and voice of the music artists the interaction sometimes switched to a very direct human-human interaction. The next time this performance will take place, more laser traps and better positioning of those traps can be used to make the interaction more rewarding and easier to follow. A lot of visitors still seemed very impressed with the performance, in that they articulated their desire for higher volumes to experience the music. Many visitors felt great pleasure to move around in an uncomplicated and professional stage lightning and felt truly invited to "play around" with the lasers and moving lights. Visitors gave very good feedback about the overall design of the stage, the lighting situation and the ambience of the whole performance space.

Artistic Performance
The artistic "counter-performance" Treat On Toes | Rules Of Interaction was used to provoke interaction within the concert. Rules and possibilities for the interaction at the concert were not declared or written and had to be observed or provoked by the artists counter-performance (e.g., step-

Figure 1: The centre stage layout of the The Breaking The Wall Event.

Figure 2: Audience members, illuminated by the screens of their mobile phones, gather around the central stage and Electric Indigo.

ping on toes, blocking the way, stalking). The performance started with a temporary barrier in the staircase, which reminds of the often senseless labyrinth-like barrier lines in airports. Just one person dared to ignore or even destroy the senseless hindrance, which was immediately reinstalled and never touched again until the end of the event. The artist provokes by coming too close or blocking the way. Only people not concentrating on the music (talking during the concert, posting things on facebook, sitting on a bench etc.) were targeted. The artist was wearing dark sunglasses with an integrated HD-camera. The objective was to observe reactions. She aimed to get very close to visitors in order to provoke them to move towards possible interactions with the lasers or the smart phones installed on pedestals. Audience members were touched with one hand and given an event-branded business card.

Critical Reflection
Observed reactions to the counter-performance intervention include feelings of embarrassment, when people felt they were transgressing orders. Women mostly rapidly moved away, some of them giggled. Men reacted with flash-lighting her face with their smart phone LED or by asking: "what do you want with these glasses?", or even by acting aggressively. One man grasped his bag asking: "what do you want from me?". Only some men moved away. Most seemed to be provoked and did not move an inch. Just some of the participants had the courage to face her and started to understand that the glasses are blinking and that this might have a meaning related to the performance. E.g., someone said: "now she is looking at us, this might have an influence on the performance". Some people also initiated playful interactions with the artist. While not all of the reactions could be documented by the glasses' built-in camera, the surveillance characteristic remained intact.

Audience Evaluation
In his article "Designing for Audience Engagement" Bilda [1] comes to the conclusion, that "an evaluation viewpoint is one that tries to gain knowledge and understanding of the audience that is as reliable as possible." In her article "The art of research in live music performance" Mine Doğantan-Dack [2] describes options including questionnaires, interviews, audio- and video-analysis, and observational case studies. To evaluate (H2) and (H4) we settled on a mixed-method approach of video analysis and interaction data logging during the performance, as well as interviews before and after the event.

For the video analysis, we used four cameras to record the performance and the audience. Overall we could observe a lot of interaction during the first two performances, most notably people building groups and collaborating around the robots, the four pedestals and the screens. In the third performance we saw people experimenting with lasers and lights, but a lot less interaction due to a lack of recognisable feedback.

We recorded 25 interviews before the event. The first interview consisted of 16 questions and was estimated to take around four minutes. In the interviews, we asked about their expectation of the opportunity to interact during a performance with robots, smartphones and lasers and they had the chance to rate their notion. Most of the surveyed people seemed to like the idea of interacting during a performance with lasers. On the other hand, the interviewees often disliked the opportunity to interact with smartphones during a music event. After the event, we recorded 22 interviews (11 of them also did the interview before the event). The second interview was designed to take about 8 minutes and included 31 questions. In general, most of the people enjoyed the performance. One person told us that it was a unique

experience for him and he was all lost in thought during the event. Another person said: "It felt like a conspiracy theory - it was a little bit creepy at the beginning, but not negatively so - it was fascinating and scary". Some people thought that the event was too challenging and that it was hard to understand the individual performances. Some of the interviewed people would have preferred a short instruction before each performance to better understand possible interactions. Then again, one of the interviewees stated that it was good to have no briefing before: "It inspired me to think!"

Conclusions

The presented critical reflection by artists and preliminary insights from the audience study lead to the following tendencies regarding the four initially presented hypotheses.

We expect mixed results regarding (H1). While all of the participating artists were excited to create systems for TMAP to be used in their performances, the actual final results varied. The more media installation-like first performance with robots fully relied on audience interaction to a degree where the music artist, though present, is not really visible to the audience. Conversely Electric Indigo decided not to include one of the primary modes of audience interaction in the morning of the performance because rehearsals with more people present made the musical result hard to control. Overall (H1) will probably be neither validated nor invalidated. Instead a balance between handing over aspects of the performance to the audience while retaining control as an artist can be be described.

Regarding (H2), overall people were open-minded to the idea of interacting within a live music performance. Recorded experiences were mixed, with some describing intrigue, curiosity and immersion, while others were confused by ambi-

guities in the presented interaction and feedback. We can conclude here that the clearer instructions and feedback are, and the better and more reliable the used technology works, the better the audience's experience is in TMAP. Also providing an environment and ambience that facilitates playful interactivity and exploration is beneficial to the experience.

(H3) discusses artists using TMAP to communicate with the audience. In the first performance the artist discussed emergent audience behaviour (crowding of the robots) that was unexpected and prompted different interactions than what we planned for. The second performance contained the strongest dialogue with the audience as the soundscape was very actively defined by the audience and their phones prompting the artist to both act (by triggering sounds) and react (by adjusting the volume balance of the PA and surround speakers with what was played back on the phones). In the third performance artist-audience communication was used to compensate for technical problems.

Regarding (H4) we saw that people feel more included the more feedback they get. The robots gave very immediate feedback and the smart phone interaction was on the one hand very palpable and on a larger scale mysterious and intriguing enough to trigger curiosity. The third performance showed that when feedback is missing the audience starts to retreat to normal, more passive roles. We also were able to observe a lot of collaboration within the audience during the first two performances, which was only partially planned for. Playful collaboration should be considered to have high potential in future systems for TMAP as a means of including the audience more tightly.

Future work will present a detailed evaluation of the four hypotheses. Building on this data we will also present detailed design considerations for playful TMAP in live music.

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