What Do Remote Music Performances Lack?

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Abstract. Our research interest is in supporting live music performances for remote audiences. Using the Evaluation Grid Method (EGM), we have analyzed why music audiences prefer live shows to recorded media and have found that a sense of unity is one of the important factors. It can be at least partly reproduced at the remote site by sharing information on audiences' reactions.

Keywords: Evaluation grid method · Internet streaming · Live music performance · Nonverbal communication · Entertainment · Remote interaction

1 Introduction

Live music performances can be considered as a kind of social interaction. Performers (musicians) play their music tunes and audiences respond to the music. Especially, in cases of rock and popular music performances, audiences often move their hands, sing, or clap. These responses are considered to be nonverbal communication between the audience and musicians. Hence, we are interested in live music performances as a field of social communication.

With the background of CSCW, it is interesting to design a remote communication environment that is similar to a local communication field. In the case of live music, using an internet streaming service is a simple solution to watch and listen to the performance remotely. However, it is obviously impossible for remote audiences to send responses back to musicians through this simple design. We have been trying to solve this problem [1, 2]. In these studies, we have designed and implemented a system that enabled remote audiences to send their reactions to musicians (e.g., waving a hand, pushing up a fist, or rhythmically shaking a hand) by showing them animations of hand avatars. However, we did not provide enough reasons to show that this design helped remote audiences enjoy the live performance.

When we design such kinds of remote communication systems, we should analyze the essential aspects of communication because remote communication always suffers from the limit of bandwidth. Especially in the case of our research domain, multi-point communication with many audiences should be supposed so that the limit of bandwidth would be more severe. As a result, we should select some essential elements of communication to be exchanged between the both ends of communication, and discard other aspects to save the bandwidth resource.

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We then have an important but simple question: What are the essential communication elements in cases of live music performances for remote audiences? To find the answer, we raised another question: Why do people prefer joining live music performances to watching them remotely or watching a recorded video?

In this paper, we will describe our analysis of this issue. We have adopted the Evaluation Grid Method (EGM) for the analysis. We will also discuss the results of analysis to design appropriate functions that can be supported by remote watching systems for live music performances.

We have also focused on the key idea of a "sense of unity." The *sense of unity* (in Japanese, *ittaikan*) is a kind of buzzword often used by both musicians and audiences to represent good experiences in live music performances. However, it is not clear in what aspects of their experiences they felt this sense of unity. We used EGM to analyze the sense of unity as well. The result will help us design what we can call *a remote sense of unity* and enable us to support it with relevant technology.

2 Evaluation Grid Method

EGM is a semi-structured interview method [3, 4]. Through this method, an interviewer recurrently asks a participant, why one thing (called *element*) is more preferable than others. By repeating this question, each participant's requirements are elicited structurally with explicit descriptions of reasons. By integrating each participant's requirement structure, an extensive structure of the requirements of the group of participants is produced.

EGM consists of the following steps:

(Step 1) An interviewer prepares a set of *elements*. An element is an object to be analyzed and compared with other elements. Usually a card with a picture or an illustration of the object is used as an icon of the element.

(Step 2) The interviewer shows the set of elements to a participant. The participant is then asked to sort the elements in the order of his/her preference.

(Step 3) The interviewer asks the participant to provide a reason as to why one element is preferable to others. The described reason is recorded as an *evaluation item*.

(Step 4) The elicited evaluation items are further analyzed by *laddering*. Laddering is performed by recurrent questions from the interviewer to the participant. Two kinds of laddering are performed: *laddering up* and *laddering down*.

The process of *laddering up* is performed by recurrent questions of "why do you think it is preferable?" This kind of questioning helps the interviewer discover more abstract reasons for the preference.

On the other hand, the process of *laddering down* is performed by recurrent questions of "can you give any concrete conditions to realize the preference?" This way, the interviewer will discover more physical or quantitative requirements.

The final output is an (or a set of) integrated graph structure(s) of evaluation items with arcs that represent laddering. We call the obtained graph an *evaluation structure*.

These steps are shown in Fig. 1.

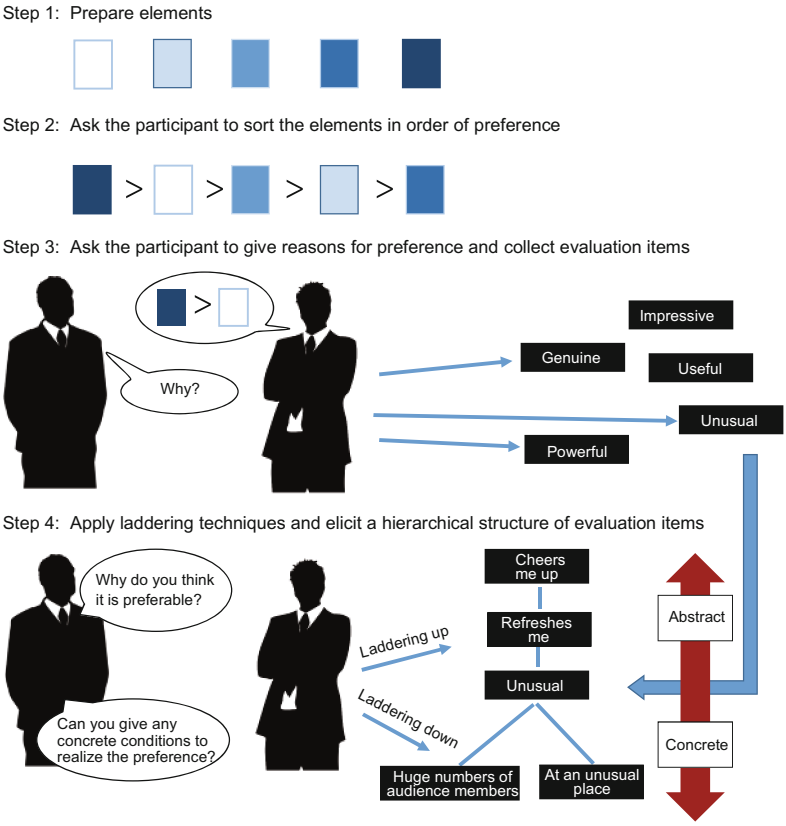

Fig. 1. The process of EGM

3 Survey

3.1 Outline

We conducted a survey using EGM from December 2016 to March 2017. We recruited 14 participants between the ages of 19 and 23. Two of them were females; the rest were males.[1] Four of the participants were student band members. Before the interview, we confirmed that all participants had had several experiences and strong interest in live shows of rock and popular music. Participants were paid for their time and cooperation. We took approximately one hour for the EGM interview of each participant.

We prepared five *elements* to compare different listening-to-music situations: (1) outdoor live festivals, (2) live shows in concert halls, (3) live shows in live houses, (4) recorded DVDs or Blu-ray Disks (BD), and (5) recorded CDs or downloaded audio files without motion pictures. Watching live shows using internet streaming

[1] We did not find any gender differences in their evaluation, at least in this group of participants.

services was not included as an *element*, because few participants had such experiences. However, watching music performances on one-way internet streaming services can be regarded as the same kind of experience as watching recorded music videos.

The survey was basically conducted in the standard EGM method (Fig. 1). However, because our research interest had a special focus on the *sense of unity*, we inserted an additional step to include the phrase "sense of unity" to the evaluation items elucidated in step 3. The inserted step was as follows:

(Step 3 +) If the phrase "sense of unity" was not included in the evaluation items, we asked the participant, "Did you have any experiences that made you feel a sense of unity during live shows?" If the answer was "yes," we further asked him/her, "Do you think that the sense of unity is one of the good reasons why you prefer live shows?" If the answer was "yes" again, we appended the phrase "sense of unity" to the list of evaluation items.

Our research interest is in supporting remote communication *during* music performances. However, collected evaluation items often included something the participants felt or experienced when music was not playing. For example, they felt something when musicians spoke, or before or after the shows. In some cases we did not apply the laddering technique to such kinds of evaluation items at step 4.

3.2 Result

Evaluation structures for the preference of live shows

We have integrated the common evaluation structures of evaluation items for three types of live shows: outdoor festivals, concert halls, and live houses (Fig. 2). The below diagram represents the value of live shows as compared with recorded music (DVDs, BDs, CDs, or audio files). In other words, it enumerates the reasons why people go to live music shows instead of listening to recorded music.

By analyzing the diagram, we suggest that the following key values are found in live show experiences.

Unusual experiences. Being at the same place as popular music players is an unusual experience in itself. Directly listening to live music with powerful sound is also an important aspect of *unusualness*.

Sense of unity. Two "senses of unity" are found: with musicians and with other audiences. A *sense of unity with musicians* is aroused by responses from musicians when audiences take reactions during the music. A s*ense of unity with other audiences* is aroused by taking reactions, cheering, or shouting with other audiences. These experiences also arouse so-called *fellow feelings* with others. With both senses of unity, audiences feel excitement owing to the synergic effect with other people's excitement.

Viewpoint. Audiences at live shows can look anywhere they want; they can watch particular musicians, see the instruments used, or observe other audiences.

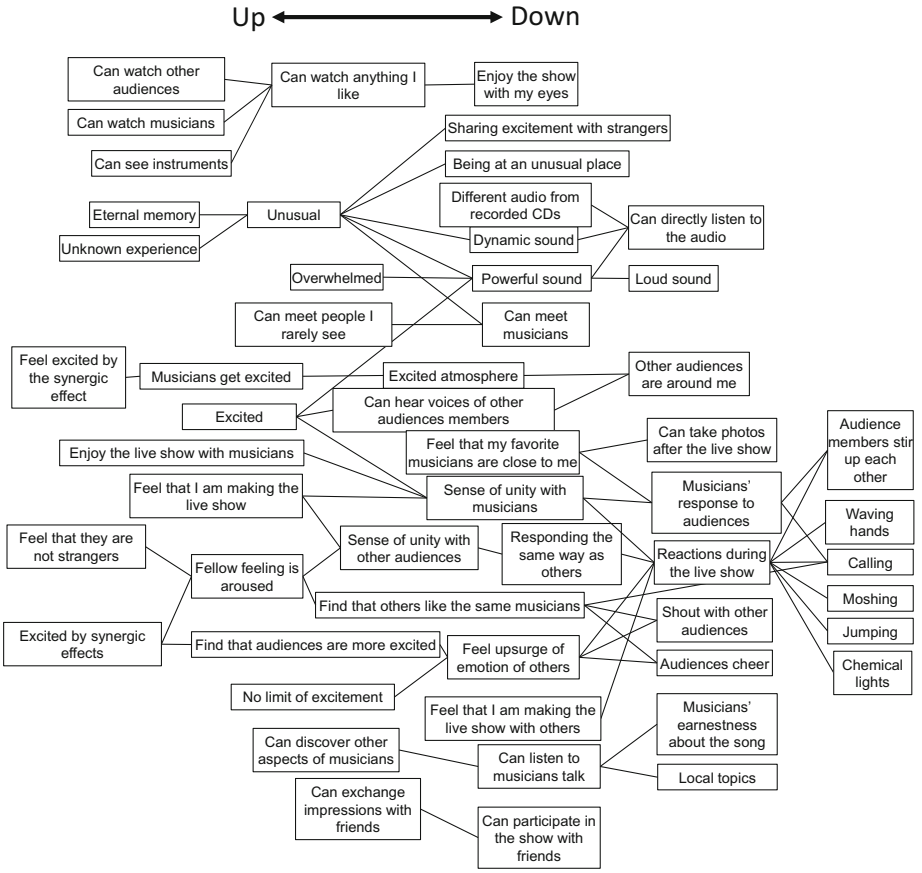

Fig. 2. Common evaluation structure for live music shows (translated from participants' casual representation in Japanese)

Tired feeling. By taking reactions, shouting, or dancing, audiences are physically tired. They feel a sense of fulfillment with this tired feeling.

Evaluation structures for three types of live shows

We drew diagrams for three evaluation structures for each type of live music performance: outdoor festivals, concert halls, and live houses. The analyzed values of each type of live shows are described below. Owing to the lack of space, diagrams have been omitted from this paper.

Outdoor live festivals. Outdoor live festivals are often held in the summer season, at places far from metropolitan areas. Many groups of musicians usually appear on the stage one by one. Survey participants enjoy outdoor festivals because they share the feeling of excitement with *huge* numbers of audience members. Some of them often swarm the stage. By watching them, audiences feel a kind of *unusualness*.

Listening to music under the sky in an open space is another example of *unusualness*.

Concert halls. In the case of concert halls, *stage effects* are highly valued. For example, audiences become overwhelmed with elevating stages, wire work, and lighting effects. These effects also arouse the sense of *unusualness*.

As with outdoor live festivals, huge numbers of audience members have been mentioned as the value of experiences at concert halls. Some participants highly valued their experience in overlooking the audiences.

Each audience member has an assigned seat, which gives him/her enough personal space. Concert halls are better than live houses because audience members do not have to worry about others and can take reactions (e.g., hand waving) more easily.

Live houses. Live houses are generally smaller than concert halls; they typically have capacities of a few hundred audience members. In many cases seats are not provided. The audience remains standing to listen to the music and members are able to move about within the live house. It is easier to dance in live houses than in concert halls, but usually too crowded to dance in the front of the stage.

In the case of live houses, proximity to the music players has been identified as one of the most important aspects. Audiences feel a stronger *sense of unity with musicians* and *unusualness* when they are close to their favorite musicians. Physical proximity allows audiences to feel mental proximity as well. When audience members take reactions, they are more likely to be recognized by the musicians.

Sound is generally louder in live houses than in concert halls or at outdoor festivals. Some participants enjoy feeling the vibration of bass tones produced in live houses.

4 Discussion

4.1 What to Support

In this section, we discuss how we can support remote audiences of live music shows by providing technical assistance to share experiences.

Let us review the values of the three types of live shows. Values of experiences at outdoor festivals are mainly found in factors related to huge numbers of audience numbers and the open-air environment. In order to share this with remote audiences, we probably need some devices to send and receive a very wide view. Such devices are costly and not popular among usual audiences. Another problem is that interactive social communication between musicians and their audiences is a less important factor in the case of outdoor festivals.

In the case of concert halls, stage effects are considered as important factors of experience. However, it is not easy to share this experience with remote audiences. Interactivity between musicians and audiences is also less important than in live houses.

Finally, in the case of live houses, physical proximity to musicians is an important factor of experiences. However, it is impossible to share remotely. Another important factor is interactive social communication — reactions of the audience and responses from musicians. From the viewpoint of CSCW, it is worth supporting. Our participants

added another value to live houses — loud sound. However, this is not easy to reproduce for remote audiences because of the sheer variety of their audio devices.

In the first half of Sect. 3.2, we have mentioned other values of live performances. One of them is the audience's viewpoint. To support multiple viewpoints, a lot of cameras must be set up at the live venue. However, it is impossible to support arbitrary viewpoints for each audience. Another value we have mentioned is the tired feeling, which is not easy to reproduce technically.

Consequently, we should focus on interactive social communication between musicians and their audiences. We then need to consider how we can share it remotely. According to our analysis (Fig. 2), a *sense of unity* is aroused when musicians respond to the reactions of audiences and when an audience is taking reactions with other audiences. If we can design a low-cost system that supports the *remote sense of unity* by providing functions that appropriately transmit reaction information between remote places, it will enhance the video streaming systems for live music shows.

4.2 Support for Minor Musicians and the Cost Problem

We have another reason to focus on live houses, which are the most popular places of live music performances. Major musicians can appear at concert halls or outdoor festivals, but most minor or amateur musicians can only use live houses, owing to the cost problem. It is not easy for them to plan a concert tour, either, for the same reason. They need a low-cost method to access listeners who live far from them. Social communication with individual fans is more important for minor musicians than for major musicians.

In introducing the viewpoint of cost, possibilities of support functions for remote audiences are described as follows:

- *Impossible or unrequired support*: the "tired feeling" of the audience; open-air atmospheres at outdoor festivals; physical proximity to musicians or other audiences; arbitrary viewpoints for individual remote audience.
- *Higher cost*: very wide view to overlook huge numbers of audience members; powerful sound.
- *Lower cost*: audience's reactions (e.g., [1, 2]); multiple (but a small number of) views.

The *sense of unity* can be (at least partly) extended to the remote site by sharing information on the audience's reactions. *Unusualness* is another important value of live performances, but it is not easy to reproduce at the remote site through technological support. It has many aspects.

5 Conclusion

We have analyzed the values of live music performance using EGM. We have elicited some important evaluation items including *unusualness*, *sense of unity*, and others.

However, it is impossible to reproduce all the values of a live music performance at a remote site. For example, physical proximity to musicians can never be reproduced.

Even if advanced virtual reality technology is used, it is less satisfactory to fans than physical proximity. *Unusualness* involves many factors including physical proximity. Hence, it is impossible to reproduce proper *unusualness* at the remote site.

Some other values could be extended to remote sites, but they are not cost-effective. Providing several views for remote audiences is one such example.

Through our analysis, we have found how a *sense of unity* is aroused by the experiences at live music shows. The reactions of the audience and the responses of the musicians are important factors. It is (at least partly) possible to remotely share this information [1, 2]. These sharing systems are expected to enhance remote experiences in live music shows.

We can discuss business models for remote live music shows. As long as the values of live shows remain at the local site, the current style of business of live music shows will survive even if some advanced remote live systems are introduced. Systems that support *the remote sense of unity*, for example, by sharing information on audiences' reactions, will provide better experiences for remote audiences. Pay services for remote live shows can be supposed. Such systems will enable even minor musicians to have social communication with remote fans at a lower cost.

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