Augmenting Media Performance with Interactive Technology

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Abstract

Music performance has always been driven by performers with audience listening to the performance. The audience does not expect to interact with the performers or even participate in the performance. This paper presents an attempt to use computer-based instruments to support traditional musical instruments to deliver an interactive media music performance in Hong Kong where such kind of performance is still regarded brand new. The interactive features employed not only enhance the interaction between the performers and the audience, but also change the way performers collaborate with each other. These were demonstrated by a performance held in July 2009 at Jockey Club Creative Arts Center in Hong Kong. This paper examines these features and analyzed the results achieved in the performance as well as the problems remained, with a view to formulate further research in this area.

1. Introduction

1.1 Augment traditional music performance with new digital musical instruments

The merits of the traditional musical instruments are well appreciated and there are numerous virtuosos pursuing professions in respective areas. Their status is not going to be replaced by any newly designed instruments. There had been earlier attempts by Tod Machover at MIT media lab to augment traditional instruments like violin and cello with additional sensors involving new interactive techniques. In recent decade, newly designed digital music instruments have been in blossom with innovative, disruptive and affordable interfaces and technologies. There had been too much focus on HCI scientific research, resulting much less concern for content development. Most of them are being studied for experimental purpose, seldom were designed to collaborate with traditional ones so that they can work together for an integrated and mixed media performance.

1.2 Collaboration among musicians

Musicians jam with each other in an interdependent way. Interdependency can be achieved when each one is responding to what is heard and reacting to other members' actions. Computer based musical instruments are mostly used to generate beat patterns to synchronize with the music played in a performance. For example, Max/Msp and Ableton Live are utilized to produce sequenced beats and sound effects to accompany traditional instruments like guitars, keyboards or trumpet in a jamming session. Different instruments with different interface designs involve unique interactive techniques. This can be elaborated by some of the sessions of the performance in the later section of this paper.

1.3 Performer audience interaction

Limited by the conventional design of a performing theatre, performers are usually located in the focal area where they are heard, viewed and listened by the audience. In order to enhance performers and audience interaction, seating arrangement, spatial location of people and technologies are studied and experimented. Numerous attempts had been made to either shorten the distance between performers and audience or encourage audience participation. Although flexibility of theatre design is introduced, studies relating to interaction design are insufficient. Expectation and feedback of the audience are explored and evaluated in this paper.

2. Performance @JCCAC Hong Kong

An interactive mixed media music performance is still rare in Hong Kong. Sponsored by the Hong Kong Arts Development Council for the venue, such kind of performance had taken place in the Blackbox Theatre in Jockey Club Creative Arts Centre which was redeveloped from an old industrial building. Details can refer to Fig. 1. Most of the team members are Master and PhD students of design and media technology with musical backgrounds at various levels.

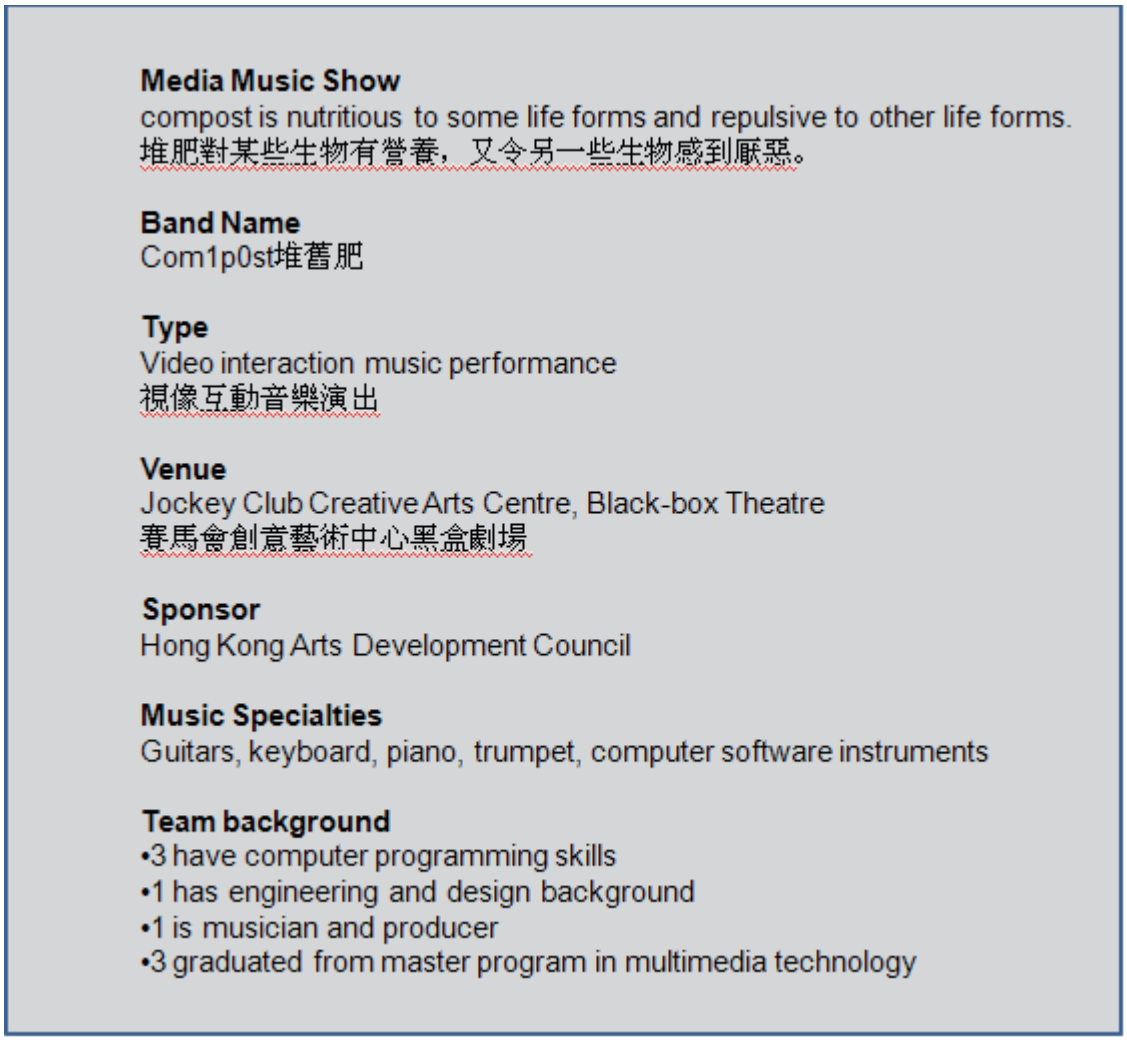

Fig. 1 Com1p0st Interactive Media Performance @JCCAC Hong Kong

Although the show served different individual purposes, it did explore some interesting observations and findings. It is not yet a detailed experiment, but more than a performance.

Objectives were identified to examine a few areas as:

How to augment traditional music performance with new digital musical instruments?

Is there a change in the way performers interact with each other with both new and traditional musical instruments?

Can interactivity be increased with the use of computer technology between performers and audience?

Would the audience find the show creative and enjoyable?

There are more than 15 sessions, but they were all fallen into a star shaped structured form (Fig. 2). The form was created by the team members Ming-sun Ho, Jupiter Chan and the author. We usually had casual talks about contents to be included during lunch and they were drafted on the scratch papers. Finally the ideas were summarized and consolidated to a form. The five key components are: Voice, Offensive, Improvise, Ambient and Traditional. All components connect with each other to build inter-relationship. Sessions were created when components cross one another. All the contents and ideas for the show were generated within this framework. The show did not explicitly inform the audience any specific messages although it did have something to tell. Instead, the audience was given freedom to construct the meanings.

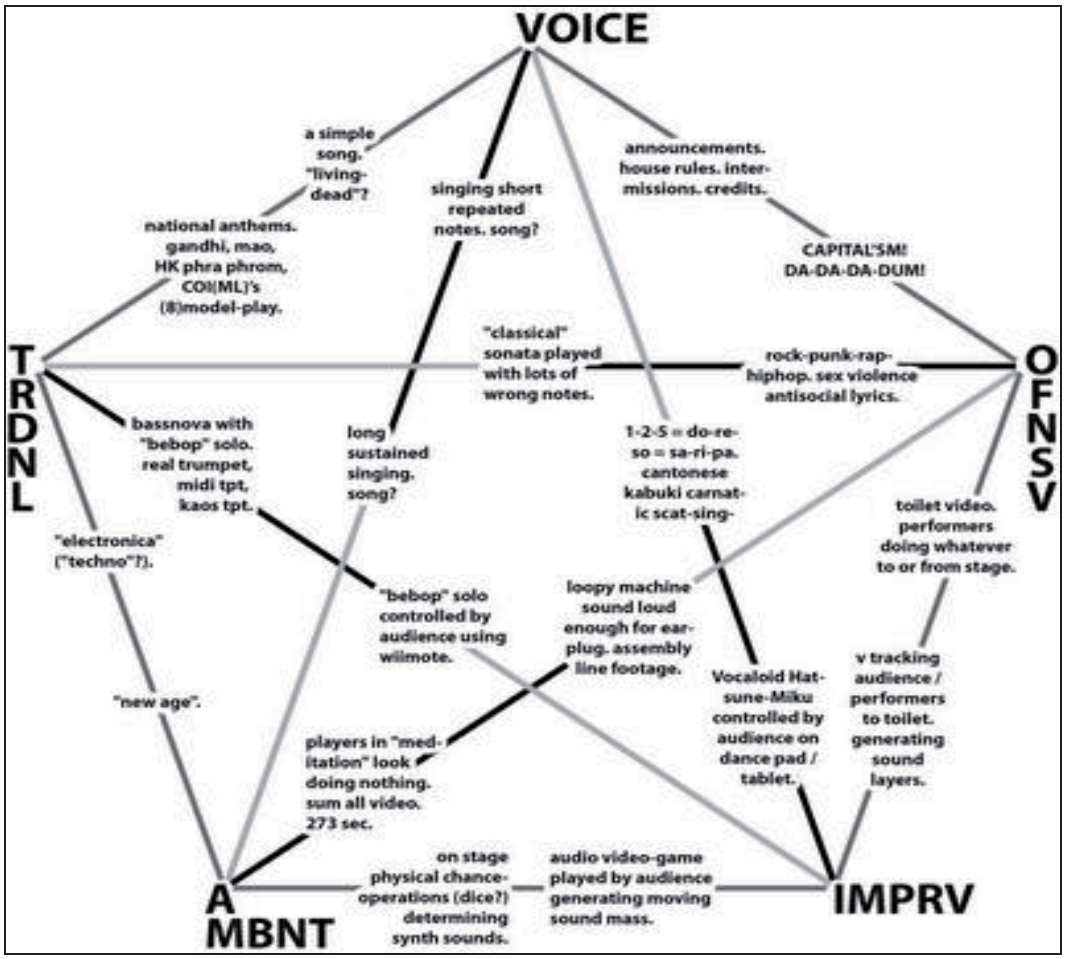

Fig. 2. The Star Shaped Structure of Contents

3. Technical Description

Although it is our objective to add more interactive features with technology in our media performance, the type of hardware and software tools to be used and how much they should be used were determined by the preferences of the band members and the contents. Time was also a critical issue in that case. More time, effort and resources would be able to accommodate larger system scale. In our band, however, ideas kept changing with hidden thoughts unfolded when the show time was approaching. With large quantity of footages including images and sound

clips, it was relatively handy to select appropriate ones and dispose unwanted parts even time was running short. However, when technology was involved in artistic content, it did not sound flexible because more time and effort were required in the tasks of software and hardware testing and computer programming. In order to allow more flexibility, we opted for solutions which offered accessible and inexpensive tools and ease in programming.

3.1 Hardware and software tools

The setup consisted basically 1 Apple Macbook Pro and 1 Fujitsu laptop. The Macbook was mainly used to connect to a midi keyboard with Garageband software for piano performances. Max/Msp was installed to trigger patches for interactive performances. The Fujitsu laptop installed Ableton Live, Max/Msp and Tapper for real time performance.

3.2 Interactive Features

3.2.1 Throwing something to the audience (in Throw Wii session)

In order to interact directly with the audience, we decided to put the Wii controller inside some everyday objects. In this case, we chose a mushroom ball. The audience was quite surprised that the ball can produce music notes and improvise when it was being turned around and thrown. We then sat among the audience and threw the ball together. The accelerometer readings in X, Y and Z axes were captured[15] by the Max/Msp patch to generate “Do”, “Re”, “So” and sound effects when the thresholds were reached.

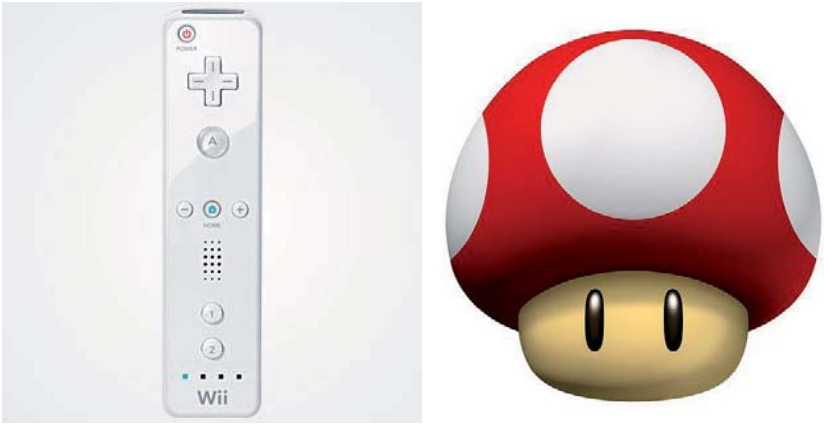

Fig. 3. Wii Controller and the mushroom ball

[15] Wii controller’s accelerometer values are captured and handled by a Max/Msp object called “aka.wiiremote” developed by Masayuki Akamatsu

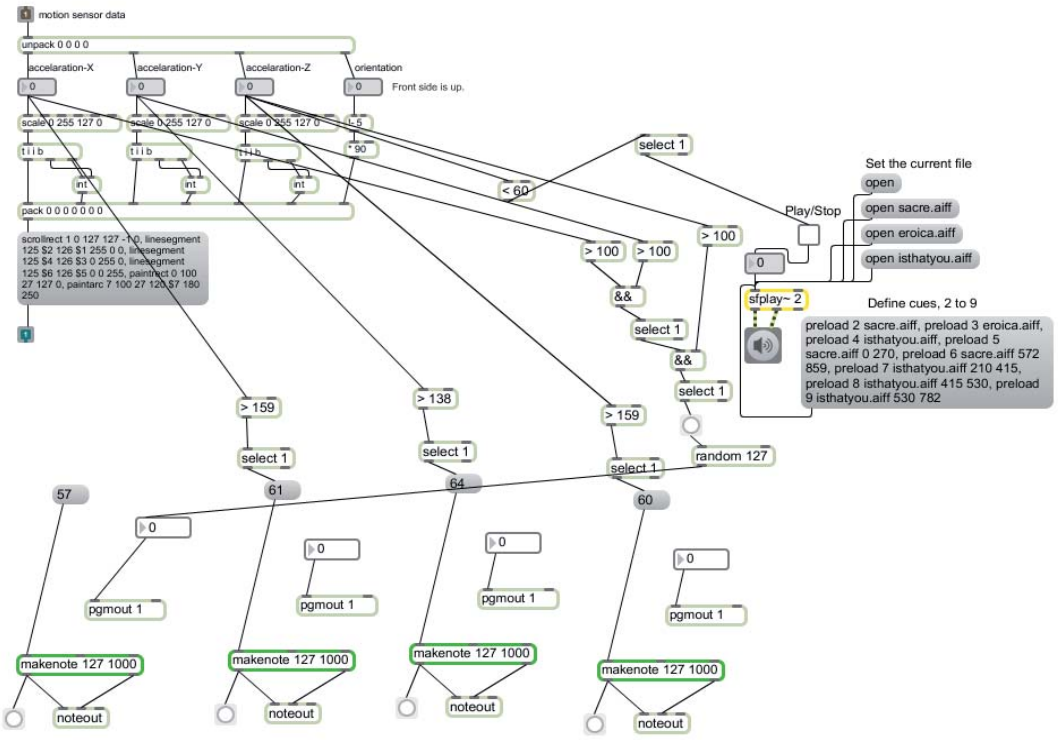

Fig. 4. Max/Msp patch capturing accelerometer values of Wii controller and generating music notes and sound effects

Fig. 5. Performers played with the audience with the new musical instrument

3.2.2 Interact with motion

In our vocaloid session, we connected a dance pad with a tapper software in which any steps on the pad can control the music rhythm. The sound was converted to human like singing voice using Ableton Live. That made the human voice sang according to the performer's steps.

Fig. 6. Vocaloid session with dance pad

3.2.3 Other devices

Apart from these, some portable devices were used. Kaossilator was used for melodic part and accompaniment for improvising and jamming sessions. iPhone was used to generate and manipulate the beat pattern with installed DJ software.

4. Interactive Media Performance Framework

Since media performance is regarded a kind of contemporary art, it is integrated, dynamic and evolving with changes of the society, culture as well as technology. Thus, an open system is suggested to accommodate any new ideas and creative ingredients (Fig. 7).

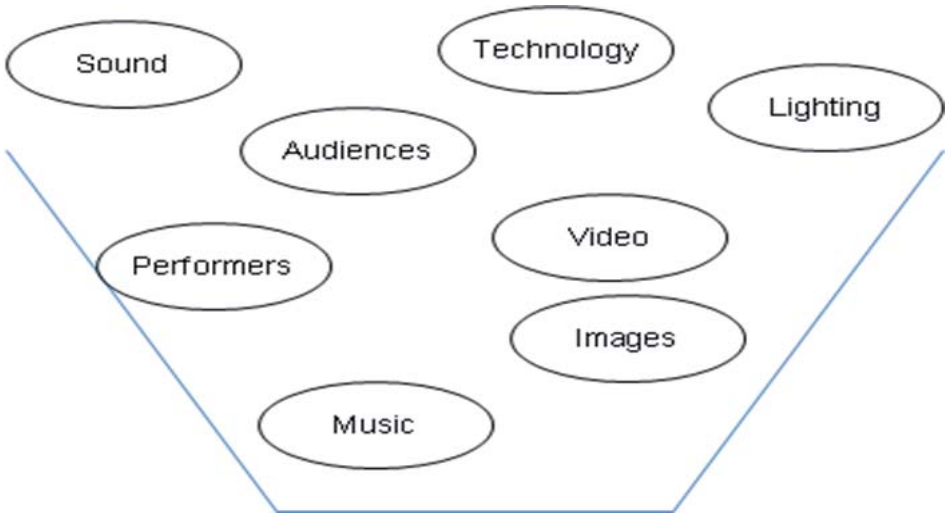

Fig. 7. An Open System for New Creative Ingredients

A conceptual diagram (Fig. 8) illustrates how interaction bandwidth can be enlarged when contents become interactive. In a typical media show with pre-recorded contents, the audience interacts with the show by perceiving what are received and understood either with or without a common ground with the performers. The audience usually responds by giving feedback or facial expression. When the contents become interactive with or without the introduction of technology, the audience interacts by participating and inputting actions to the system. The system thus responds immediately by giving feedback to the audience and the performers. As indicated by the diagram in Fig. 8, the interaction bandwidth is enlarged from the inner circle to an outer bigger one.

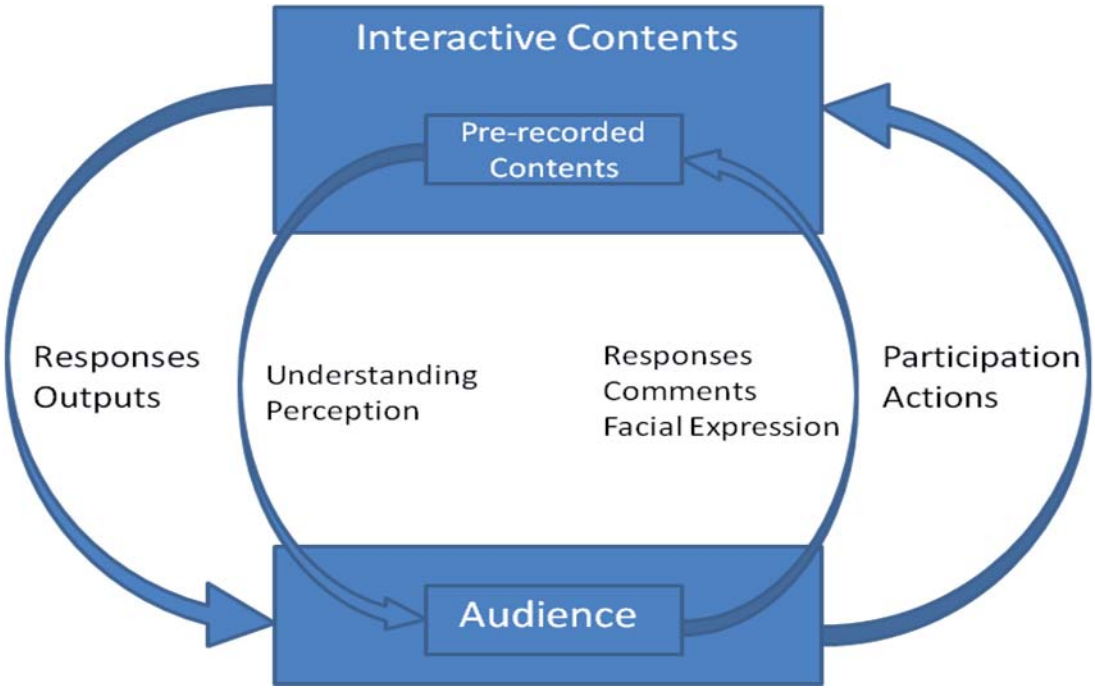

Fig. 8. Interaction Bandwidth enlarged

5. Discussions

5.1 How to augment traditional music performance with new digital musical instruments?

Computers, no matter hardware or software, are as a matter of course regarded as tools only for making creative contents. Sequencers have been used for music composition and sound production. It is not uncommon to use more than a half virtual instruments for professional production like music recording or making advertisement scores because of cost saving. In a live mixed media performance, digital musical instruments are often used too to bring some new ingredients and excitement. To work with traditional musical instruments, interaction should go beyond simply rhythm sequencing. Different interfaces involve unique interactive techniques and generate specific sounds.

If the sounds from some interfaces are highly expressive and the controls are easy to operate, then they can be used for melodic parts. In our rehearsals and jam sessions, we used Ableton Live, Garageband and Kaossilator (a portable device for live performance and recording with touch pad which requires scratching and moving of fingers) for improvising melodic parts. It is not possible to be fast and accurate enough on some interfaces, for example dance pad. In our performance, it was used as a bass instrument in a Bossa Nova piece and trigger of synthesized beat patterns. Software design also plays an important role in affecting how digital instruments can collaborate with traditional instruments. If buttons, sliders and menu selection are the only ways to control, then they very frequent changes.

5.2 Is there a change in the way performers interact with each other with both new and traditional musical instruments?

Like other musicians, we spent a lot of time in ensemble during rehearsals. Because it was the first time we performed together, and we needed more time to learn and understand each other. No matter what instruments we used, we needed to express ourselves while following some chord patterns and responding to triggered changes.

People may think that laptop performers only need to point and click, drag and drop, eyes staring at the LCD with minimal facial expression. If new interfaces are being used, they are mainly performed and explored in experimental exhibitions with various kinds of sensational feels and gestures communicating to the system.

In our case, those playing guitars, keyboard and trumpet required skillful techniques even though they were improvising. For those who are playing computer instruments, there was no special technique or practice required. However, we did need to listen to each other and accompany all together. The computer performers will have more control over the status changes and overall effects

6. Evaluation

The show accommodated 80 seats and we had 26 people came to it excluding all workers. Four people were finally invited for an interview. All of them expected that they would be placed in an audience seating area with single perspective to the stage. However, we did not have distinctive performer or audience areas in our stage design. The audience can sit anywhere on the floor and we can perform anywhere.

6.1 Can interactivity be increased with the use of computer technology between performers and audience?

In order to enhance interactivity between performers and the audience, we did introduce some sessions like “Rave Party” to encourage them to dance with us. People in Hong Kong are generally passive and do not expect to participate much. Hopefully most of them were willing to dance and had fun together. In the “Throw Wii” session, we were throwing a toy ball among the audience. There was a Wii

controller hidden inside. When the ball was thrown, the motion readings in X, Y and Z axes will trigger some midi notes. In this way, people holding the ball were improvising. The performers sat among the audience and played with them. Thus, the audience participated in the improvising session.

All four interviewees agreed that the show was interactive with technology and it was the first show of this kind that they had ever seen. They were asked about the sessions they liked and disliked. Two of them mentioned that the "Throw Wii" session was most interactive because the performers were playing together side by side with the audience. Besides content and technology, seating arrangement in that case helped a lot.

6.2 Did the audience find the show creative and enjoyable?

The four interviewees all have design background with two specialized in animation. They commented that the show was creative overall. For the most creative part, different people had their own individual preference.

Apart from being creative, we aimed to provide an enjoyable performance and experience to the audience. Although there are lots of interactive media performances in the world, not many of them are enjoyable. That means, either people cannot get some fun from them or they are astonished by the first 5 minutes experience but cannot maintain sustainable interest. When the interviewees were asked if they would come if similar show was available, the answers were positive.

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References

[1] Sparacino, F., Davenport, G., Pentland, A. (2000). Media in performance: Interactive spaces for dance, theater, circus, and museum exhibits. IBM Systems Journal., Vol 39, NOS 3&4.

[2] Whalley, I. (2005). Traditional New Zealand Maori Instruments, Composition and Digital Technology: some recent collaborations and process. Organised Sound 10(1): 57-65. Cambridge University Press.

[3] Blaine, T., Perkis, T. (2000). The Jam-O-Drum Interactive Music System: A Study in Interaction Design. Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques.

[4] Jordà, S., Geiger, G., Alonso, M., Kaltenbrunner, M. (2007). The reacTable: Exploring the Synergy between Live Music Performance and Tabletop Tangible

Interfaces. TEI '07: Proceedings of the 1st international conference on Tangible and embedded interaction.

[5] Weinberg, G. "The Aesthetics, History, and Future Challenges of Interconnected Music Networks." International Computer Music Conference. Göteborg, 2002.