TMAP Design Cards for Technology-Mediated Audience Participation in Live Music

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Abstract

In this position paper we present a new approach to music interaction design. We propose the TMAP Design Cards as a tool and method to generate and advance ideas for technology-mediated audience participation in live music (TMAP). The first draft set of cards was built on the TMAP Framework, which describes and maps out the design space of TMAP based on series of analytical and explorative research methods. In the context of "Breaking the Wall"[1], an art-based research project on TMAP, the set has already been used in several design processes but so far the final set of TMAP Design Cards has not been evaluated across the full cycle of design, development and application. In this paper we present the TMAP Design Cards and give information about the empirical process of building the theoretical framework that supports them. The workshop presents a promising opportunity to discuss strategies for application and evaluation of these cards with experts.

Author Keywords

Technology-mediated audience participation (TMAP); live music; design tools and evaluation; design cards.

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[1] http://www.piglab.org/breakingthewall (last access 29.1.2016)

Figure 1: Different cards as tools for inspiration, guiding and shaping during design: (1) IDEO Method Cards, (2) kribbeln im kopf creative sessions, (3) Intangibuild, (4) IdeenRausch, (5) Innovative Whack Pack, and (6) Design with Intent

Figure 2: Front and back sides of four exemplary TMAP Design Cards.

ACM Classification Keywords

H.5.5. Sound and Music Computing. H.5.2. User Interfaces

Introduction

Design in the field of technology-mediated audience participation (TMAP) requires to balance interests of different stakeholders. In live music these e.g. include musicians, spectators, visual artists or audio engineers, to mention some. Approaches to let an audience participate in live music are manifold. Some date back to Mozart's times using dice [1], more recent ones utilise technologies to include an audience interactively [2]. The latter work, done by Mazzanti, also presents metrics to describe and evaluate participatory performances [2].

To support design processes in different domains, various sets of cards such as the IDEO [3] have been developed in the past (Figure 1). With the importance of ludic design processes to interactive and participative art [4, 5] in mind we came up with the idea to transfer such methods to the space of TMAP. To support communication among those involved in a joint design process, we developed a set of 48 TMAP Design Cards (Figure 2). These cards constitute a tool-driven method for generating and advancing ideas within the particular focus of audience participation in live music.

In this position paper we briefly describe the TMAP Framework, which maps out the underlying design space. We use TMAP as a newly coined term, to address the field of technology-mediated audience participation in live concerts. Using this framework, we drafted the TMAP Design Cards and iteratively tested them with experts and a class of design students.

We present the final set of TMAP Design Cards, which can be found in the Appendix A, and discuss possible methods of applying them as a useful design tool for TMAP. The context of the related art-based research project "Breaking the Wall" gives us the opportunity to evaluate the cards in a full cycle of designing and applying technology for participatory performances. This includes idea generation, iterative development, and final application at pubic live performances all done together with popular music artists.

TMAP Framework

The purpose of the framework is to describe the design space of technology-mediated audience participation (TMAP) in live music by analysing the literature and practical work in this field.

We used a mixed method approach [6] incorporating both qualitative and quantitative methods from HCI and art-based research. The quantitative evaluations provided more formal results while the expert peer review and self-reflection allowed for more practise-based insights and reflection.

In particular, we developed the TMAP Framework in five consecutive steps: (i) systematic data collection through literature, (ii) iterative category building, (iii) consolidation and abstraction, (iv) testing of the framework with a class of interaction design students, and (v) expert peer review of the framework from music, design and HCI perspectives. A journal submission outlining the full process is currently under review.

Overall, the TMAP Framework contains 180 entities which are hierarchically structured on four levels. The

Figure 3: Three preliminary drafts of TMAP Design Cards.

Figure 4: Design session of three students using the TMAP Design Cards.

root of this four-level tree contains the three main categories Motivation, Impact and Interaction. For the sake of a more balanced and clear structure the main categories are followed by sub-categories on the second level. The third level contains focused scopes within each sub-category. We refer to them as choices as they address particular areas of application. Finally, the fourth level holds the 119 possible design aspects distributed among all choices. These rather general design aspects are enriched by concrete exemplary suggestions for application.

TMAP Design Cards

The TMAP Design Cards constitute a practical application of the TMAP Framework. At the same time they present the opportunity to transfer a supportive tool from design in non-music domains to a tool for design in music interaction.

Inspired by other design cards we created several drafts of the TMAP Design Cards. These were revised in a series of collaborative steps with three experts (game designer, graphic designer, and interaction designer). Figure 3 illustrates three preliminary drafts from the workshops with the experts.

The final set (Figure 2 and Appendix A) consists of 48 cards in four categories (roles, motivation, influence, interaction) and three cards with a description of how to use the TMAP Design cards. There are two notable differences to the TMAP Framework. First, for the design cards we extracted the subcategory 'roles' from the main category 'motivation' as a separate category of cards. Second, the category 'influence' as used in the design cards, was renamed to 'impact' during the course of further developing the TMAP Framework.

The recommended process for using the cards is: Every person draws a role card (red) which defines the person's role. Everybody keeps thinking for a moment about the role and refines it quietly and then draws another card in addition to the role card. The person who starts takes an Influence card (blue), the second one an Interaction card (green), the third one a Motivation card (yellow), the fourth an Influence card, and so on.

Now everyone tries to create an idea based on the card's Challenge on the front side and the further Explanation below. The user is recommended to not turn around a card immediately but do so if further Suggestions are needed while finding an idea. This is followed by a group discussion where everyone contributes ideas based on their own cards. During the whole design process using pen and paper is explicitly recommended to make notes and sketches.

For a first trial, sets of TMAP Design Cards were given to four groups of three students each in a design class at the University of Anonymised. The students used the cards to generate ideas for TMAP in self-organised workshops. They documented the design sessions (Figure 4) and critically reflected on the TMAP Design Cards and the whole process of their application. In the end, all groups presented their results in form of short video sketches and reported back about their experience from the design sessions. The students mainly used the cards as recommended. However, they reported back that they changed roles on demand when certain roles were too restrictive to find ideas.
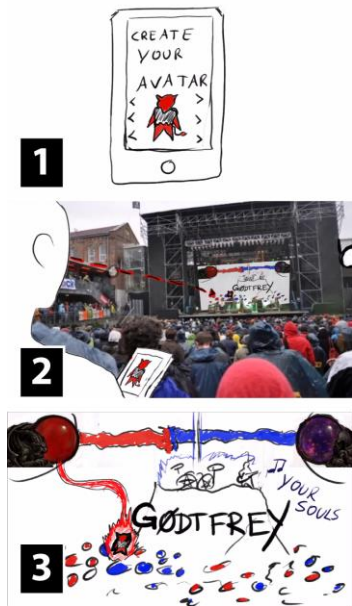
Figure 5: (1) Spectators create an avatar prior to the concert, (2) all avatars appear on a projection on stage, and (3) during the performance avatars "enter an epic battle between the forces of light and evil that decide which course their concerts take." [7]

Summary & Future Outlook

The application of the TMAP Design Cards with students showed that the cards can be used to generate interesting and partly novel ideas for TMAP. Thus the cards present a promising approach towards design for technology-mediated audience participation in live music. Also first trials using TMAP Design Cards in actual design workshops seemed to work.

The most interesting idea created by students using the design cards was the "Battle for Gødtfrey", an interactive smartphone app to augment the performance of a fictional "Viennese medieval folk/metal band" [7]. See Figure 5 for sketches and a brief description of the concept.

However, especially the trials with the students and what they reported back based on their workshop experience indicate the need to further improve the TMAP Design Cards, especially regarding more specific guidelines for their application. Most identified problems concerned wording and misunderstanding the design challenges presented on the cards. Another issue addressed the process of using the cards together in a group.

With the TMAP Design Cards we present a tool that concerns researchers both within music interaction as well as within a broader HCI community. To our knowledge, using a card-driven design process is new to music interaction design.

The open questions that concern us within this context are: (i) how can we improve the guidelines for the application of the TMAP Design Cards to use them in the context of popular music performances, and (ii) how can we evaluate such a tool considering both HCI and art-based research methods?

To answer these questions we will test the cards by designing an interactive live performance as part of the "Breaking the Wall" research project. We further propose to present and possibly even apply the final set of TMAP Design Cards for discussion within a group of experts around music and HCI at this workshop.

References

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Appendix A

TMAP Design Cards

Content:

3 Description Cards

48 Design Cards

Related paper:

"TMAP Design Cards for Technology-Mediated Audience Participation in Live Music"

TMAP Design Cards
Recommendations for Usage

Purpose

Generate ideas and concepts to create audience participation in live music or add participatory elements to a live performance.

Use the TMAP Design Cards either in a group or on your own.

Preparation

Separate the deck and make four piles, one of each colour. The coloured side of a card is its main side and always appears

faced up. Shuffle each pile and have pens and paper prepared.

TMAP stands for "Technology-Mediated Audience Participation"

The cards' main side

The fully coloured side of a card is its main side. Always use the main side first when you draw a card and do not turn around a card immediately.

Use a card

Read the *Challenge* and the optional *Explanation* carefully to trigger your imagination.

Turn around a card

Do not turn around a card immediatley after you draw it! Always try to think on the basis of the *Challenge* and the *Explanation* first. However, you may turn around a card if you need further *Suggestions*.

Multi Person Mode

Recommendations for Usage

Preparation

Every person draws a role card (red) which defines the person's role.

Everybody keeps thinking for a moment about the role and refines it quietly.

Hint

If the Group Size extends six people, we recommend to make smaller groups of three or four people each.

First round

Everybody **draws one card** in addition to the role card. The person who starts takes an *Influence* card (blue), the second one an *Interaction* card (green), the third one a *Motivation* card (yellow), the fourth an *Influence* card, and so on.

Now everyone tries to **create an idea** based on the card's *Challenge* and the further *Explanation* below.

Do not **turn around a card** immediately but do so if you need further *Suggestions* while you create your idea.

This is followed by a **group discussion** where everyone contributes ideas based on their own cards. Use pen and paper to make notes and sketches.

Further rounds

After the first round, further rounds may follow. At this point **cards may be discarded** if wanted to draw a new card and even from another colour. Discarded cards may be either fully discarded from the game (of course only for this session) or discarded for later use by dropping it on the related sketches or notes of the finished previous round.

Single Person Mode

Recommendations for Usage

For using the LiveMAP Design Cards alone, read the Multi Person Mode instructions first and in addition the alterations on the back side of this card.

In Single Person Mode we highly encourage you to use Pen and Paper to sketch your ideas instead of just thinking.

Alterations

You may draw a *Role* card (red) but you may
also **define a role** on your own.

Act as if you were doing a session in a group
but **draw all cards by yourself**. First, draw an
Influence card (blue), then an *Interaction* card
(green), then a *Motivation* card (yellow), then
another *Influence* card and so on.

However, **do not draw more than one card
at once**. Everytime when you draw a card,
think thoroughly about the *Challenge*, read
the *Explanation* and finally turn the card to
make use of the *Suggestions*.

Always **make notes and sketches** to write
down your ideas before you draw another
card.

Role. Who are you?

Consider your direct involvement in the performance as a performer

The Role you have is defined by a certain

Involvement. Various kinds
and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

Performer

Imagine you are an artist who plays an instrument, sings or does live coding to create music is involved in the interaction for instance.

Consider your direct involvement in the performance as a spectator

Challenge

The Role you have is defined by a certain

Involvement. Various kinds and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

Explanation

Audience member

Imagine yourself among the spectators
that are involved while they attend
the performance directly, prior to it or
afterwards, for instance.

Consider your direct involvement in the performance as an organisational assistant

The Role you have is defined by a certain

Involvement. Various kinds and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

Organisational assistant

Imagine you are involved as an assistant for organisational concerns, e.g. ticket collector, usher or security.

Consider your direct involvement in the performance as a performance assistant

The Role you have is defined by a certain

Involvement. Various kinds and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

Performance assistant

Imagine you are involved as an assistant for the actual performance, e.g. someone responsible for sound, light & visuals, stagehand, master of ceremonies.

Challenge

Consider your indirect involvement in the performance as a composer

Explanation

The Role you have is defined by a certain

Involvement. Various kinds and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

Composer

Imagine you are a composer who writes a
song considering audience participation for
its later performance even if not involved as a
performer.

Consider your
indirect involvement
in the performance
as a manager

Challenge

Explanation

The Role you have is defined by a certain

Involvement. Various kinds
and degrees of involvement motivate
stakeholders to be part of a participatory
performance at some point.

Manager

Imagine yourself as manager that utilises audience participation to raise the artist's reputation or to gain popularity through innovation for instance.

Challenge

Consider your indirect involvement in the performance as a marketer

Explanation

The Role you have is defined by a certain

Involvement. Various kinds
and degrees of involvement motivate
stakeholders to be part of a participatory
performance at some point.

Marketer

Imagine yourself as marketer that utilises audience participation for marketing, promotional aspects or strategic feedback for instance.

Challenge

Consider your indirect involvement in the performance as a creator

Explanation

The Role you have is defined by a certain

Involvement. Various kinds and degrees of involvement motivate stakeholders to be part of a participatory performance at some point.

CREATOR

Imagine yourself involved in the actual
technical realisation of a concept for audience
participation such as a programmer or
engineer.

Challenge

Include someone for social reasons

Explanation

The Motivation could be led by a certain Goal. Different goals can drive the motivation to establish audience participation in a live performance.

Entertainment

What if playing an entertaining game is necessary to participate?

Feeling of togetherness

What if participants get in touch with each other by finding random peers or within groups of friends?

Activity

What if moving the body such as jumping or stretching is necessary to participate?

Awareness

What if the participation changes the perception of the whole performance and affects issues other than music?

Motivation. Why are participants involved?

Include someone for artistic reasons

The Motivation could be led by a certain

Goal. Different goals can drive the motivation to establish audience participation in a live performance.

Creativity

What if creative aspects drive the motivation to let people participate whether they fulfill constructive or destructive purposes?

Inspiration

What if the participation of people is seen as source of inspiration to either enrich or limit artistry for instance?

Engagement

What if the participation affects the people's behaviour and how they are engaged in a motivating or deterrent way for instance?

Challenge

What if the participation challenges a particular paradigm, such as switched off mobile phones during concerts or sitting quietly on a chair the whole time?

Motivation. Why are participants involved?

Include someone for academic reasons

The Motivation could be led by a certain

Goal. Different goals can drive the motivation to establish audience participation in a live performance.

Behaviour

What if the analysis of a certain crowd behaviour (e.g. among the audience, the artists or both) is the reason for letting people participate?

Music

What if the analysis of the music itself or musical processes such as composing a song are reasons for enabling participation?

Engineering

What if the creation and deployment of new systems or the use of a certain technology drives the motivation of a participatory performance?

Motivation. Why are participants involved?

Include someone for commercial reasons

The Motivation could be led by a certain

Goal. Different goals can drive the motivation to establish audience participation in a live performance.

Marketing

What if the concept for interaction includes giveaways or digital gadgets for advertising merchandising products?

Data

What if audience participation helps to get particular information about customers (i.e. fans) for further use?

Motivation. Why are participants involved?

Consider issues that constrain the actual realisation

The Motivation could be led by a certain **Constraint.** Possible constraints might limit the motivation to establish audience participation in a live performance.

Technical feasibility

What if the required technology is not available or not appropriate for particular settings (e.g. performances in huge venues)?

Costs

What if the costs to realise a concept for audience participation are inappropriately high for instance?

Motivation. Why are participants involved?

Consider issues that constrain the actual execution

The Motivation could be led by a

certain **Constraint.** Possible constraints might limit the motivation to establish audience participation in a live performance.

Acceptance

What if the audience or the musicians deny the participatory elements for certain reasons?

Legal

What if copyright or privacy issues get in the way of the realisation?

Ability

What if the concept requires special skills that, for instance, prevent many people from participating?

Target group

What if the spectators or the majority of the audience belong to a specific group of people (e.g. children, old people)?

Challenge

Influence temporal characteristics of the music

Explanation

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

Tempo

What if the tempo is changed and the music is getting slower or faster according to the participation?

Meter

What if the meter of a song is influenced, such as fourth-fourth time or waltz time?

Beat

What if the beat is influenced by changing accentuation for instance?

Rhythm

What if the rhythm (e.g. note lengths) is subject to the participation?

Influence. What is the target of participation?

Influence the sound considering basic aspects

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

16 | Musical | Sound (basic aspects)

Pitch

What if the participation affects the pitch which might be definite (e.g. piano), variable (e.g. violin) or indefinite (e.g. cymbal) for instance?

Dynamics

What if the dynamics of a performed piece of music are influenced, e.g. the loudness or softness?

Timbre & Tone colour

What if the timbre or tone colour (e.g. bright, dark) of the sound itself is changed by the participation?

Influence the sound considering compositional aspects

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

Mode

What if the participation affects the mode, for instance, changing the scale from major to minor?

Harmony

What if harmonic structures, such as triads or chords are influenced?

Melody

What if the melody is changed in terms of an improvised variation or a solo by the participants, for instance?

Texture

What if the texture varies due to the participation which affects the way melodic, rhythmic and harmonic elements are intertwined (e.g. polyphonic, monophonic, homophonic)?

Challenge

Influence the creation of sound

Explanation

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

Instrument or Voice

What if an instrument or the voice becomes the target of participation, for instance, a guitar, a choir, or the sampling or looping with a computer?

Playing or Singing

What if the playing or singing becomes the target of participation, for instance, the instruction to a performer to play louder, faster or another solo?

Effect

What if sound effects (e.g. delay, distortion) or any combination are affected by the participation?

Spatialisation

What if spatialisation plays a role, such as the number of different sound sources that exist (e.g. stereo, surround) and their distribution in the room (e.g. acousmonium)?

Challenge

Influence structural characteristics of music

Explanation

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

Figure

What if a figure (e.g. riff, phrase) is influenced?

Form

What if the form of a song, such as the overall layout of the composition or the number of chorus repeats are influenced?

Notation

What if the notation is affected by the participants whether it is as modern staff notation or as written descriptive notation, for instance?

Challenge

Influence conceptual characteristics of music

Explanation

The Influence could be on something

Musical. Certain musical characteristics and their creation can be the target of influence of a participating audience.

Genre

What if the musical genre becomes the target of participation such as classical music, electroacoustic music or noise?

Style

What if the style of music is influenced, for instance, by describing it (e.g. "music for a particular mood", "christmas music")?

Challenge

Consider the location of appearance where the influence happens

Explanation

The Influence could be on something

Visual. Visual aspects might be the target of influence in a participatory performance.

On stage

What if elements on stage such as spotlights
or video projections are affected?

Off stage

What if elements off stage are affected,
for instance, directly among the audience
members or their surrounding area?

Off venue

What if the influence happens off venue, e.g.
in a live stream or on social media?

Influence. What is the target of participation?

Challenge

Consider different types of visual elements that might be influenced

Explanation

The Influence could be on something

Visual. Visual aspects might be the target of influence in a participatory performance.

Ambience

What if ambient elements such as light or fog are affected?

Information

What if the participation is visualized as text, voting charts or pictures, for instance?

Challenge

Consider the influence on perceptible physical elements

Explanation

The Influence could be on something

Physical. Several physical elements can be considered to be the target of an influencing audience.

HAPTIC

What if the influence becomes haptic,
for instance through a vibrating phone,
temperature, wind, sprinkling or powerful
subwoofers?

SMELL

What if the influence affects the smell such as
scented fog or smoke?

Challenge

Consider the influence on concrete physical elements

Explanation

The Influence could be on something

Physical. Several physical elements can be considered to be the target of an influencing audience.

TEMPORARY

What if the influence affects concrete physical elements temporarily such as moving the stage, rise platforms, moving a drumkit, moving spotlights or the movement of a dancer?

PERMANENT

What if the influence affects permanent physical elements such as a unique live record of the show or other special products which are given away right after a performance?

Challenge

Influence the content considering the lyrics

Explanation

The Influence could be on something

Contentual. Textual content might be the target of participation when an audience is included in a performance.

REPRODUCTION

What if the influence addresses the reproduction of lyrics such as letting spectators sing along existing lyrics?

CREATION

What if the influence affects the creation of lyrics, for instance, by defining the content of a song or by creating actual words or phrases?

Influence the content considering information

Explanation

The Influence could be on something

Contentual. Textual content might be the target of participation when an audience is included in a performance.

NUMBERS & STATISTICS

What if numbers and statistics are subject to the influence, such as letting spectators vote or rate something or count the number of people according to a certain behaviour?

TEXT

What if textual information is part of the influence, for instance, real-time chat conversations or social media messages?

MEDIA

What if the influence contains any kind of media, such as photos or videos taken by the audience?

Challenge

Consider spatial movement for interaction

Explanation

The Interaction could be dependent on

Space. Spatial aspects might shape the nature and ways of interaction.

SITTING

What if sitting spectators interact by clapping or doing a mexican wave (laola), for instance?

STANDING

What if standing spectators interact by tapping with the foot or by jumping, for instance?

MOBILE

What if spectators are mobile which allows them to walk around or dance, for instance?

Interaction. How does participation happen?

Consider the spatial setting for interaction

The Interaction could be dependent on

Space. Spatial aspects might shape the nature and ways of interaction.

LOCATION

What if the actual location plays a role (e.g. indoor, outdoor roofed, open air)?

SIZE

What if the size of the location makes a difference (e.g. club, concert hall, stadium, living room)?

TIME OF DAY

What if interaction is dependent on the time of day (e.g. sunlight, night)?

Interaction. How does participation happen?

Consider the spatial distribution of interacting participants

The Interaction could be dependent on

Space. Spatial aspects might shape the nature and ways of interaction.

ON-SITE

What if interaction depends on the on-site distribution of the spectators at the venue (e.g. front of stage, in the back)?

REMOTE

What if interacting participants are distributed remotely (e.g. through a live stream at home)?

Challenge

Consider the quantity of interacting participants

Explanation

The Interaction could be dependent on

Space. Spatial aspects might shape the nature and ways of interaction.

LARGE-SCALE

What if a huge audience is present, for instance more than 1000?

SMALL-SCALE

What if a small audience is present (e.g. a couple of 100 or less)?

Challenge

Consider the chronological order as an aspect of interaction

Explanation

The Interaction could be dependent on

Time. Temporal considerations can characterise the actual interaction.

SYNCHRONOUS

What if the interaction happens in real-time, for instance, during the performance?

ASYNCHRONOUS

What if the interaction happens before or after to the performance (e.g. vote for setlists, provide personal data to be used in the performance, rate songs afterwards)?

Interaction. How does participation happen?

Consider accuracy for the interaction

The Interaction could be dependent on

Time. Temporal considerations can characterise the actual interaction.

TIME CRITICAL

What if the interaction is time critical (e.g. sound synthesis which should have none or very low latency)?

LATENCY TOLERANT

What if the interaction is latency tolerant, for instance, data collection of audience opinion or behaviour?

Challenge

Consider interaction in terms of acoustics that is humanly generated

Explanation

The Interaction could be dependent on

Acoustics. Acoustical elements and considerations might be relevant for interaction.

VOICE

What if interaction is based on audible sound produced by the human voice (e.g. singing along, shout, cheer)?

GESTURES

What if interaction is based on audible sound produced by human gestures (e.g. clap, snip, clomp)?

Challenge

Consider interaction in terms of acoustics that is artificially generated

Explanation

The Interaction could be dependent on

Acoustics. Acoustical elements and considerations might be relevant for interaction.

CENTRALIZED

What if audible interaction happens
centralized (e.g. through PA speakers)?

DECENTRALIZED

What if audible interaction happens
decentralized (e.g. through the spectators'
mobile phones)?

Challenge

Consider interaction based on expressive emotion

Explanation

The Interaction could be dependent on

Emotion. An interaction can be driven by emotional aspects.

VERBAL

What if emotional interaction happens verbal
(e.g. laughing, shouting)?

NON-VERBAL

What if interaction is based on non-verbal
emotion, such as facial expressions or
gestures?

Consider interaction based on physiological emotion

The Interaction could be dependent on

Emotion. An interaction can be driven by emotional aspects.

OBVIOUS

What if emotional interaction happens obvious, for instance, jumping or screaming spectators?

SUBTLE

What if interaction is based on subtle emotion (e.g. heart rate, skin conductance)?

Challenge

Consider the relationship of the interacting participants

Explanation

The Interaction could be dependent on

Individuals. An interaction might be dependent on the role the participants have for participation.

COLLABORATIVE

What if all spectators have to act or achieve something collaboratively (e.g. singing the same phrase, bouncing a balloon)?

COMPETITIVE

What if spectators are competing, such as who cheers louder?

INDEPENDENT

What if spectator act independently, for instance, everybody makes a secret choice/ vote at the same time?

Challenge

Consider the unit setting of the interacting participants

Explanation

The Interaction could be dependent on

Individuals. An interaction might be dependent on the role the participants have for participation.

INDIVIDUAL

What if all spectators interact individually, for instance, by operating their own mobile phones?

IN GROUPS

What if spectators can or have to form groups to interact, for instance, all people in the front, middle and back of the venue?

ALL TOGETHER

What if all spectators interact together as a whole (e.g. tracked visually, sound level measurement)?

Challenge

Consider the identification of the interacting participants

Explanation

The Interaction could be dependent on

Individuals. An interaction might be dependent on the role the participants have for participation.

PUBLIC

What if the interaction is public and every spectator's participation is somehow visible or traceable (e.g. cheering, waving hands)?

ANONYMOUS

What if the interaction happens anonymous, for instance, by measuring a certain behaviour or using smartphones?

SEMI-PUBLIC

What if the interaction is semi-public, for instance, everybody has to register at the entrance while the actual interaction is not traceable by the audience?

Interaction. How does participation happen?

Consider a playful approach for interaction

The Interaction could be dependent on

Knowledge or Skill. A

certain knowledge or skill can be taken into account for participation.

ABILITY-ORIENTED

What if a playful interaction is ability-oriented, similar to GuitarHero or SingStar?

ENTERTAINMENT-ORIENTED

What if a playful interaction is entertainment-oriented where the audience plays a game with artefacts or objects, for instance?

Interaction. How does participation happen?

Consider a methodical approach for interaction

The Interaction could be dependent on

Knowledge or Skill. A

certain knowledge or skill can be taken into account for participation.

APPLY/USE CERTAIN KNOWLEDGE

What if a special knowledge is required for interaction, e.g. that the participants are musicians/can play music?

LEARNING APPROACHES

What if the interaction includes a learning approach, for instance, learning by doing where the participants learn something step by step during the performance?

INTUITIVE

What if the interaction expects an intuitive behaviour (e.g. if you give someone something that looks like a pipe in a musical context, people will most probably blow in it to try it out)?

Interaction. How does participation happen?

Consider a random approach for interaction

The Interaction could be dependent on

Knowledge or Skill. A
certain knowledge or skill can be taken into account for participation.

TOTALLY UNPREDICTABLE

What if the interaction includes random elements that are totally unpredictable, such as rolling a dice?

SOMEHOW PREDICTABLE

What if the interaction includes somehow predictable elements, for instance, assumed behaviour patterns within a group of humans?

Challenge

Consider the transparency of the feedback given to the interacting participants

Explanation

The Interaction could be dependent on

Feedback. Feedback as a central element of interaction can be considered differently.

OBVIOUS

What if the feedback of the interaction is obvious (e.g. visual feedback as figures or charts of every individual on a big screen)?

SUBTLE

What if the feedback of the interaction is subtle (e.g. the measurement of a particular behaviour, such as the movement of spectators throughout a performance is not perceived by anyone)?

Challenge

Consider the target of the feedback

Explanation

The Interaction could be dependent on

Feedback. Feedback as a central element of interaction can be considered differently.

INDIVIDUALS

What if everyone gets individual feedback, for instance, on a smartphone or a wristband?

GROUPS

What if groups of spectators get different feedback (e.g. only people in the front of the stage get feedback of their interaction or different feedback for sitting and standing spectators)?

NONE

What if no one gets any feedback (e.g. if something is measured/observed during a performance and only used later for analysis)?

ALL

What if everybody gets the same feedback (e.g. the whole audience hears an influenced sound or votes of the spectators are screened publicly on stage)?

Challenge

Consider the perspective of the interacting participants

Explanation

The Interaction could be dependent on **Action.** The way interacting participants might act or react may be varied for participation.

ACTIVE

What if the interaction requires an active behaviour, such as controlling certain parameters of a device or doing particular gestures?

PASSIVE

What if the interaction happens passively (e.g. visual recognition is used to observe the audience's behaviour)?

Interaction. How does participation happen?

Consider the method that characterizes an interaction

The Interaction could be dependent on **Action.** The way interacting participants might act or react may be varied for participation.

MODIFYING

What if the interaction modifies something existing, such as changing sound effect parameters of an instrument?

CREATING NEW

What if the interaction creates something new from scratch (e.g. all spectators perform together to create music collaboratively)?

ADD SOMETHING

What if the interaction adds something new to something existing (e.g. the audience is considered as an additional "musician")?

Challenge

Consider the artefact that characterize an interaction

Explanation

The Interaction could be dependent on Action. The way interacting participants might act or react may be varied for participation.

USING OBJECTS

What if the interaction requires special objects, such as a traceable marker, a phone or throwing things around?

HUMAN BODY

What if the interaction requires the human body (e.g. moving arms, clapping, singing)?

Interaction. How does participation happen?

Consider the depth of interaction

The Interaction could be dependent on **Action.** The way interacting participants might act or react may be varied for participation.

HOLISTIC

What if the interaction affects certain aspects holistically, for instance, audience members join the band on stage to play a whole song, the setlist for a concert is created collaboratively, or the ambience of the light during the whole show is influence

PARTLY

What if the interaction affects a performance party, for instance, the audience decides about the encore at the end of the concert, the audience participates only during the chorus, or a single spectator sings some lines of verses?