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# 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"<sup>1</sup>, 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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<sup>1</sup> <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 public 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.

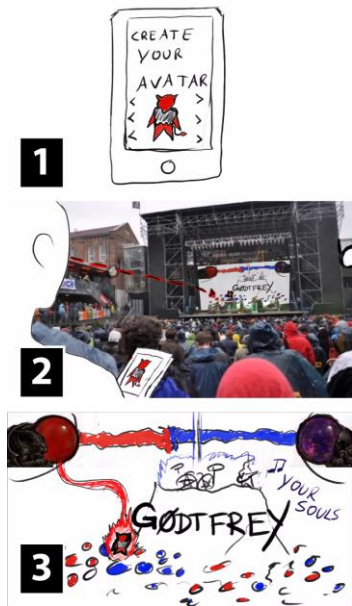


Figure 5: (1) Spectators create an avatar prior to the concert, (2) all avatars appear on a projection on stage, and (3) during the performance avatars “enter an epic battle between the forces of light and evil that decide which course their concerts take.” [7]

## 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

1. Mozart, W. A. (1793). Anleitung so viel Walzer oder Schleifer mit zwei Würfeln zu componiren so viel man will ohne musikalisch zu seyn noch etwas von der Composition zu verstehen. Bonn: N. Simrock.
2. Mazzanti, D., Zappi, V., Caldwell, D., & Brogni, A. (2014). Augmented Stage for Participatory Performances. In Proceedings of the International Conference on NIME (pp. 29–34).
3. IDEO (2002). IDEO method cards: 51 ways to inspire design. <https://www.ideo.com/work/method-cards/> (last access 29.1.2016)
4. Gaver, W. Bowers, J. Boucher, A. Gellerson, H. Pennington, S. Schmidt, A. Steed, A. Villars, N. & Walker B. (2004). The drift table: designing for ludic engagement. In CHI’04 extended abstracts on Human factors in computing systems.
5. Morrison, A. J., Mitchell, P., & Brereton, M. (2007). The lens of ludic engagement: Evaluating participation in interactive art installations. In Proceedings of the 15th international conference on Multimedia (pp. 509–512).
6. Creswell, J. W. (2009). Research Design (Third Edition). SAGE Publications.
7. Koller, R. Schuster, F. Singer K. (2015). Battle for Gødtfrey. Master student seminar project. Vienna University of Technology.