

Thematic Analysis for Sonic Interaction Design

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In this position paper we present case studies of the use of Thematic Analysis in Sonic Interaction Design to inform iterative design and to reveal underlying conceptual understandings of new forms of interaction. One case study used Thematic Analysis to explore people's creative engagement with novel interactive music systems. The second case study used Thematic Analysis to explore how co-creation could be structured across cultures. The key challenges faced in these case studies include: i) connecting Thematic Analysis results to analysis of logs of interaction; ii) organising identified themes into a structured framework; iii) translation between languages; and iv) connection between themes identified and stage of a co-creation process.

Thematic Analysis. Sonic Interaction Design. Creative Engagement. Cross-Cultural Design.

1. INTRODUCTION

The Sonic Interaction Design Lab (SIDLab) at Queen Mary University of London explores through new ways of encountering sound in interaction from interactive art to real time data sonification. Researchers in the SIDLab use qualitative techniques including Thematic Analysis to understand people's responses to exploratory forms of Sonic Interaction Design. The role of Thematic Analysis in these iterative design studies is to provide insight into people's understanding of, reflection on, and experiences of the Sonic Interaction Design as part of an exploratory iterative design process. As Sonic Interaction Design is about designing and evaluating interactive systems that prioritise sound over vision (Serafin et al., 2011), data collection methods which do not rely on visual aids are preferred, such as interviews, and we find that approaches such as Thematic Analysis are useful ways to analyse such data, especially when the design exploration is quite open ended with no prior hypotheses or design requirements.

Sonic Interaction Design is especially important in the post-screen world we live in (Bryan-Kinns, 2017) where the pervasive, affective, and co-temporal features of sound contribute to the design of:

- Mobile and wearable interaction;
- Systems for creative, expressive, artistic interaction;
- Tangible and physical interaction i.e. interactive objects which have no screen;

- Cross-cultural design e.g. where affordances of sound are foregrounded over textual representations;
- Internet of Things and smart appliances;
- Eyes-free interaction e.g. whilst attending to another task such as driving;
- Accessible interaction.

In this position paper we present case studies of the use of Thematic Analysis in Sonic Interaction Design to inform iterative design and to reveal underlying conceptual understandings of new forms of interaction. Previous work used Discourse Analysis (e.g. Stowell et al., 2009) and Grounded Theory (e.g. Meckin et al., 2013) to explore the same research questions. However, we found these approaches to be too analytically heavy in terms of time taken to undertake the analysis and the theoretical grounding required to understand and apply them. Instead, researchers in the SIDLab have turned to the use of Thematic Analysis as outlined by Braun and Clarke (2006) as an analytical approach which is easier to learn and apply, and is less time consuming than Discourse Analysis or Grounded Theory.

2. CASE STUDIES

We present recent case studies from the SIDLab in which Thematic Analysis was used as part of Sonic Interaction Design in the early stage of iterative design processes.

2.1 Creative Engagement

In Wu et al. (2017) a Thematic Analysis was used to identify responses to the design of two Interactive Music Systems (ISMs) created for novice musicians. Ten participants took part in a controlled experiment in which they were asked to firstly explore the two novel ISMs and then to create short pieces of music. The ISMs were designed to produce similar sounds using radically different visual user interfaces which had different control metaphors. One ISM was based on painterly control metaphors, whereas the other ISM was based on reactive control metaphors.

2.1.1 Analysis

Semi-structured interviews with participants took place after they had used both ISMs. The interviews included questions on: satisfaction with outcome; the experience of learning to use the ISM; the creative experience; the interaction model; and the graphic design. Thirteen themes were identified through an Inductive Thematic Analysis of the interview data: Solo listen; Affordance; Simplicity; Consistency; Serendipity; Precision; Controllability; Repeatedly; Structure Composition; Readiness Time; Manage Sound; Play Live; Starting Base. Some of these themes related to specific user interface elements e.g. Controllability, whereas others related to higher level approaches to the creative activity e.g. Play Live.

2.1.2 Informing Design

The results of the Thematic Analysis in conjunction with observations of use and questionnaire responses informed the understanding of people's learning and creating behaviours in the interaction process, and were used to develop a number of design guidelines for ISMs including providing mechanisms to: learn the sound; support playing live; catalyse insights; and scaffold composition. In this way the Thematic Analysis contributes to informing the design of future ISMs and Creativity Support Tools in general.

2.1.3 Challenges

There were two main challenges: i) connecting Thematic Analysis to analysis of logs of interaction; ii) building a structured framework of themes in relation to the research question of uncovering what are people's processes of creative engagement with ISMs.

All the interaction with ISMs was logged and then analysed to identify patterns of behaviour in the data. For example, patterns of behaviour in the learning stage were identified which distinguished between people who tried each UI function individually to those who explored multiple functionalities at the same time. It was thought that there may be some connection between the patterns of interaction and the themes that emerged from the Thematic Analysis for individuals. However, no

obvious evidence was found to support correlation between the patterns of interaction in the logs and the themes. Future work would further examine whether quantitative patterns in interaction logs in any way connect to themes in qualitative data. Possibly more in-depth or more powerful analysis of the logs might offer greater opportunities to connect with the qualitative data.

The second challenge was to build a structured framework of themes to make sense of the research question. The research question was intended to shed light on the concerns and reflections that may need to be designed for in Learning, Exploring, and Creating stages (derived from existing literature). In the research the themes identified were then grouped under these three stages by the researcher to give a meta-level grouping of themes. As the themes often occurred in multiple stages e.g. the Simplicity theme might occur in the Learn and Explore stage. This meta-level grouping is inherently subjective and lacks generalisability to other contexts. More reliable mechanisms for structuring themes and connecting themes to stages of creativity need to be identified.

2.2 Co-Creation

In Bryan-Kinns et al. (2018) a Thematic Analysis was used to identify reflective themes which emerged in a cross-cultural co-creation process. This research explored "how interactive drama could be used as a design goal for co-creation across cultures, how the co-creative process might be structured, and what value might emerge through this non-utilitarian focus" (ibid.). The research was undertaken over 13 days of digital making and interactive performance creation with the Kam ethnic minority group in the southwest of Hunan Province (湖南), China, and a team of 13 researchers, culminating in a public performance with three interactive props and an exhibition of three interactive artworks.

2.2.1 Analysis

The raw data for the Thematic Analysis came from extensive field notes, interviews with designers, researchers, locals, and audience members. Interview questions were open and prompted interviewees to freely talk about their background, their thoughts about the interactive objects created, and team members were also asked questions about their experience of the design process. Questions and answers were in both Chinese and English, with all Chinese responses being translated to English for the Thematic Analysis.

Deductive Thematic Analysis was used to analyse the interview responses, with an initial set of themes including the key topics of the research project: co-creation, and interactivity. Coding was open to

identification of additional codes and themes as found in the data.

Thirty nine codes were identified in the Thematic Analysis which led to 6 themes as reported in Bryan-Kinns et al. (2018): i) Design process; ii) Co-creation; iii) Interactivity; iv) Translation; v) Drama style; vi) Local context.

2.2.2 Informing Design

The role of Thematic Analysis in this project was to understand responses to interactivity across cultures, reflect on the design process used, and to inform the structure and design of future field work. As such the Thematic Analysis formed an evaluative and meta-evaluative part of the design process, providing insight into responses to the interactive objects created and the design process itself.

2.2.3 Challenges

There were two main challenges: i) translation and ii) relation to the cross-cultural co-creation process.

Language posed the first challenge in undertaking the Thematic Analysis as all Chinese interview responses needed to be translated to English to be analysed with the English responses. However, translation is a subtle and skilled activity with many subtle and potential meanings lost in the translation even by skilled translators. In addition, local dialect needed to be translated to Chinese before translation to English which further compounded issues with translation. Similarly, all questions and prompts for interviews needed to be in both English and Chinese, and in doing so there is potential for the questions to have different interpretations in English and Chinese. To address this the researchers attempted to use multiple translators to validate the translations, however, given the short time in the field there was insufficient time to verify the translations in-situ. Another option would have been to undertake Chinese interviews and Thematic Analysis separately to the English interviews and Thematic Analysis. This approach may generate more valid codes, but the codes and themes would then be separate for English and Chinese.

The second challenge was how to use the Thematic Analysis to evidence the forms of cross-cultural co-creation that emerged in the research. A wide range of forms of cross-cultural collaboration were reported, and so a notation was developed to capture the structure of collaboration which allowed the Thematic Analysis to focus on capturing the content of the collaboration. Without this notation there would have been substantially more codes generated which would have slowed the analytic process. This notation could then be used to identify the balance of participation in the co-creation process e.g. which groups instigated the most collaboration.

3. SUMMARY OF KEY CHALLENGES FACED

The key challenges faced in these case studies of using Thematic Analysis in Sonic Interaction Design explorations include: i) connecting Thematic Analysis results to analysis of logs of interaction; ii) organising identified themes into a structured framework; iii) translation between languages; and iv) connecting between identified themes and the stages of a co-creation process.

Developing reliable ways to connect the results of Thematic Analysis to stages of participant activity, for example in a creative process, would be valuable for increasing the use of Thematic Analysis.

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