
Towards electronic digital music practice for neurodiverse people

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Abstract

This paper gives an overview on the DEIND project which aims to connect neurodiverse people with the field of contemporary electronic and digital music practice.

In pursuit of this, people with autistic spectrum disorders are invited to take part in the design process of electronic instruments.

The close integration of target group members into the research process encourages a bilateral learning process: on the one hand, there is an intense and fruitful experience for the participants developing, on the other hand, involved researchers will identify design challenges specific to the target group yet very likely reveal new perspectives on the broader view of their respective area of research.

Keywords

Keywords go here.

ACM Classification Keywords

H.5.2 Information Interfaces and Presentation: User interfaces – Evaluation/ methodology

Introduction

Caused by recent technological as well as cultural developments – cheap electronics, rapid prototyping technologies, respectively the DIY, maker and demo scenes – the majority of people in the western world are able to creatively express themselves in a multitude of ways. Apart from mainstream hypes such as the hipstamatic phenomenon¹ the tools for digital content creation as well established social and cultural niches featuring unique expression vocabularies, e.g., embodied by experimental electronic music practice.

People with disabilities, however, mostly lack the possibility to take part in such cutting-edge movements: assistive technologies and careful design considerations are often of secondary interest to the designers and developers of the required technology, especially when it comes to the facilitation of cultural niches².

However, questions remain on how, for example, electronic music practice (*EMP*) can be scaffolded to support people facing challenges in society due to differences in their neurologic development: How can *EMP* support them in expressing themselves in an experimental way beyond mainstream? How can it make the engaging nature of *EMP* accessible for them without pressing it into too much guidance? Can *EMP* empower them to even shape their own social niche(s) in the above-mentioned sense?

This paper gives insights on how the DEIND project, which aims to connect neurodiverse people with the field of contemporary electronic and digital music practice, approaches these questions. In pursuit of this, people with autistic spectrum disorders are invited to take part in the design process of electronic musical instruments. To facilitate music practice, we aim for a holistic instrument experience rather than a modular approach in which the underlying modules of electronic instruments, interface & mapping & sound synthesis,

would become too evident, possibly interfere with the flow experience. The close integration of target group members into the design cycle encourages a bilateral learning process: On the one hand, there is an intense and fruitful experience for the participants, on the other hand, it opens the opportunity for the involved researchers to identify challenges that are specific to this group yet reveal new perspectives on the broader view of their respective research area.

Research hypothesis and central questions

The central hypothesis of this project can be broken down to the following sentence:

Making the field of electronic music practice accessible to ND people empowers them to actively participate in an area that, after Headlam [13], already paralleled specifics of ND thinking.

Out of this hypothesis, four questions arise that we want to answer over the course of the project:

1. Which aspects of electronic music are sufficiently interesting for the target group?
2. In which sense does the active engagement with electronic music affect the aesthetic perception of target group members?
3. In which direction do people of the target group develop their skills in electronic music making over the course of the project?
4. What can we learn from people with autistic spectrum disorders when it comes to non-verbal communication, creativity and music practice?

¹See e.g. <http://www.kunsthal.nl/en-22-681-Hipstamatic.html>

²This is by far not caused by bad faith, furthermore grounded in the very constraints inherent to such cutting edge movements

To find answers to these questions, we intend to carry out research according to the methods described in the following section.

Implementation and research methods

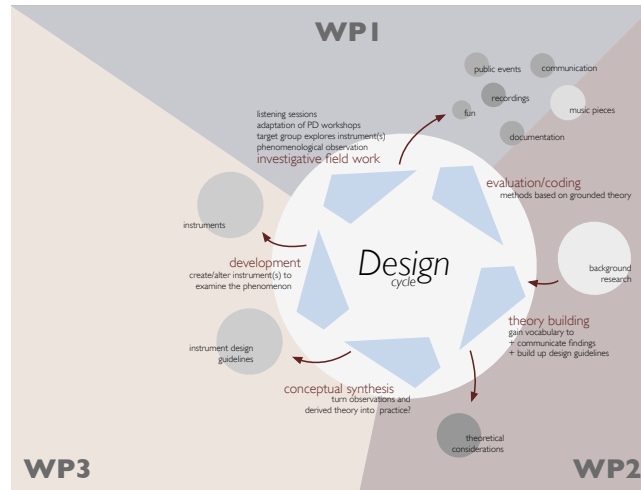


Figure 1: A structural overview of the design cycle showing interrelations of the WPs.

We investigate the above-mentioned research questions through three work packages (see also Figure 1).

WP1 – investigative field work This WP covers the actual work with the target groups and the collection of data on which the other WP's rely on. Interactive participatory design sessions are conducted in which the participants are introduced to contemporary electronic music and (later on) to the instrument prototypes to be built in WP3. A particular focus lies on playing the instruments and giving the people an opportunity to explore their possibilities. During these sessions, the musical

play is recorded and various other research material such as drawings, written comments and interviews is collected.

WP2 – evaluation & coding, theory building In this WP, the material gathered in WP1 is analysed and put into a broader context by incorporating knowledge gained from background research eventually leading towards a theory of electronic music practice for neurodiverse people.

WP3 – conceptual synthesis & instrument development This WP aims to turn the observations and derived theory of WP1 & WP2 into practice by (a) turning the theoretical considerations into practical guidelines and (b) creating and altering instrument prototypes that in turn are used in WP1.

This project is mainly based on practice-oriented qualitative research methods. Therefore we extensively draw from participatory design and ethnomethodological research methods adapted to the target groups' intrinsic character. To fulfil the above-listed objectives, we intend to apply a combination of experimental and theoretical methods that are based on both artistic and scientific research practices. The subsequent list gives an overview on the methods as intended to be used for the work packages. By their combination, new knowledge for specific electronic instruments will be gained, generalised and finally fed back into the respective research areas.

WP1 Adaptation of participatory design workshop methods, focus group sessions, concerts and phenomenological observations of target group members exploring musical possibilities of instruments resulting in interviews, field notes, questionnaires and quantitative measurements.

WP2 Grounded theory and phenomenological analysis based on recorded research material combined with background research in related fields.

WP3 Rapid software and hardware prototyping, incorporating the Aalto facilities (Aalto MediaFactory, Aalto FabLab, textile-workshop, wood-workshop).

First iteration

In which we give an overview about the first design iteration.

initial workshop

Tells that we had a kick-off meeting with all contributing members followed by a one-day trip to our project partner Nuorten Ystävät in Imatra. This was followed by an initial workshop day at which we discussed arising challenges (tell which!).

We came up with possible ideas for the system design (give examples for the prototype ideas and why they were considered).

instrument prototyping

We decided to develop two of the many ideas further, namely the rhythmical interaction part and the idea on room modes.

audio prototyping

Reports on the two to seventeen audio prototypes we did: the ambient system (complexRes), the FM matrix, the autoLoopPointer, the diodeRing, the noiseRing

sensor prototyping

reports on the different sensors we looked at, e.g. switchDesigns (floor plan, imatra map)

interface prototyping

Mentions (again) that we're focusing mainly on textile-based interfaces. Why is that so? We have some knowledge and want to extend it. Because textiles are nice to touch, give a lot of haptic feedback and are easily accepted (when showing the prototypes to people, they immediately grasp for them and hug them. Happened for real!) We did an initial interface design with *conductive fur*. We describe conductive fur, how we anticipated its usage, how it feels and how it works. We as well give sound examples on how it sounds with and without added effects.

sonic environments

Contact microphone attached to the ventilation outlet to capture its vibrations. FM synthesis

field trip

We tell about the first field trip to Imatra and what happened there, namely five days of intense listening sessions. We further explain the general day layout and that we tried to fit our interventions into it. Also quite important is that we actually wanted to keep the fun factor in the equation: it should not be difficult, no heavy learning process should be involved. Why? Because the goal of the project is music practice not music therapy or learning.

The people there are different. Different in the sense that they value other things than I expect from someone on the street.

general impressions made on the field trip

look at notes made in Imatra and report those as general observations.

data analysis

describe what can be observed in the video session with participant 1 (rhythmical patterns).

lessons learned

oh my. so many. e.g. slowness, security,

Conclusion and outlook

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