«New» Interfaces in Sound and Music Education?

- New technologies, such as video tracking, sensors and multitouch devices, have become widely available
  - Combined with advanced synthesis and signal processing capabilities
- “Apps” offer new and accessible possibilities to use advanced music tools and technologies, even without in-depth musical knowledge
  - Are becoming increasingly popular with educators
- New technologies afford integration of media & modalities, potentially support IME
- Adequate Music Education – related research efforts still in infancy:
  - Need for a reflective approach to technology:
    - “(...) teachers often fail to consider appropriate pedagogical strategies when using technology with music students” (Bauer, 2014, p. xiii)
- Most existing research and applications focus on “Apps” and conventional note / melody / harmony / rhythm related approaches
- An in-depth (design) critique of user interface / interaction paradigms is missing
**Inspiration: New Interface for Musical Expression (NIME)**

Since its beginning in 2001 as a CHI workshop in Seattle, NIME brings together scientists, engineers, designers and artists around New Interfaces for Musical Expression.

**Music Education Is Also Sound Education**

- **Development of “sound music” in the 20th century**
  - Pierre Schaeffer, Karlheinz Stockhausen
  - Jimi Hendrix
  - “Ecological” approach to meaning in music (Clarke 2005)

- **Consequence:**
  - Opportunity (both technological and conceptual!) to work with sound as fundamental material of musical expression
  - understanding and creating “sound objects”
  - building the instrument (the conditions and rules of sound generation), not “just” playing it

- **Democratization of sound technology proper**
  - Digital musicianship is still mostly about moving notes for existing instruments around on a grid. The tools for modulating sound are quite complex. How can we make them accessible?

- **So.. What about "understanding and creating sound" - interfaces?**
Towards Pedagogically Motivated Design Research

- **Design Research**: dealing with possible futures and "wicked" problems
  - Donald Schön, the reflective practitioner — common reference in DR & PR
  - Artifact and activity centered, informed by activity theory (Kaptelinin & Nardi 2006)
  - "Designerly ways of knowing" (Cross 2001), abductive, iterative process (Kolko 2010)
  - Multisensory design (Haverkamp 2012) -> Link to Integrated Music Education

- **Methodical approach**
  - "Participatory Design" (Mareis, Held, Joost, 2013)
  - "Experience Mockup" (Buchenau & Sun 2000)
    - from pen-on-paper to functional prototypes
  - Generation of **artifacts and discourse**

- At the same time: **applicable in teaching, educational value**!
  - Close integration with workshop and classroom settings

- **Towards an integration of pedagogical and design research**
  - Integration with existing model of TPACK (Mishra & Koehler 2006, in Bauer 2014), extending it with the DESIGN dimension.

Partners & The Four Fields of Action of «NISE»

- **Partners FHNW**:
  - School of Education, Music Education Sek I&II
  - Academy of Music, R&D Dept.
  - Academy of Art & Design, IxDM
  - School of Engineering, 4D Institute

- **Multitouch**
  - Multitouch Soundmanipulation

- **Virtual & Augmented Soundspaces**
  - Ludosonica
  - Sonic Classroom — Das klingende Klassenzimmer
  - Sonically Augmented Playgrounds

- **Computational Music**
  - Computational Music Thinking (SI EduNAT)
  - Sonification of Mathematical Phenomena (EMP-Math)
  - Sonification of Crawl Swim Movement

- **Physical Sound Computing**
  - Sonically Augmented Playgrounds
FOA 1 // Multitouch Sound Manipulation

- Abundance of “music” apps
  - the common “basics”, “elements” of music education (e.g. harmony, composition, performance) is covered (in principle)

- Major paradigms:
  - mimetic approaches, “skeuomorphism”
  - “embodiment” of musical theory, harmony etc., often combined with “prefabricated” elements or automatisms

Garageband: Sequencer & mimetic (smart) instruments, skeuomorphism
Rockmate: Mimetic, keyboard paradigm
Thumbjam: More abstract, embodiment of musical systematics, sensors add “expressivity”

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FOA 1 // Multitouch: Old Wine in New Wineskins?

- Pitch Painter: Yet another piano roll...
- Bubli Draw: A fancy loop sequencer – no real connection between shapes and music
  (but very nicely crafted!)

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Multitouch Pen-On-Paper Mockup Experiment

TAIK Group 4 (SDS)

TAIK Group 3 (SDS)

PH-FHNW, Group 5 (MES)

EAS, Group 3 (ME)

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30.04.2015

FOA 2 // Soundspaces & FOA 4 // Physical Sound Computing: Sonic Playground

Examples of Sonic Playground Prototypes from Workshop at Interaction Design, ZHdK (Hug & Kemper)

Layla Gaye et al., Sonic City

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FOA 2 // Soundspaces: Sonic Classroom

Ludosonica

InHands: free-improv set
by
Ilkka Niemeläinen
Antti Siren
James Andon

InHands System, based on PESI
(http://sopi.media.taik.fi)

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FOA 3 // Computational Music Thinking, EMP Math & Music

PingPong Simulator, Martin Guggisberg, 2015

AgentCubes (A. Repenning, PH FHNW Prof. Informatische Bildung)

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30.04.2015
Auditory Display & Sonification

- Precursors: Earcons & Auditory Icons
- Listening to the Mind Listening: Sonification and Music
  - Example by John Dribus
- Seibert: Movement Sonification

Literature

Cross (1982): Designerly Ways of Knowing. Design Studies, 3, 4
Riley (2013): Teaching, Learning, and Living with iPads, in: Music Educators Journal vol. 100
Thank You!

Interested in exchange or collaboration?

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April 24, 2015