



A Mixed Methods Approach

To Qualitative Enquiry, Focused on Primary Age Group Music Workshops in a Special Educational Needs School

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Why?



Increasing access in early years



Understanding context



Creating more sensitive design responses



Where?

Threeways
School, Bath UK

Approach



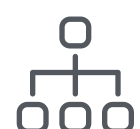
Longitudinal Embedded - Spending time as teaching assistant and workshop leader - Reciprocal approach



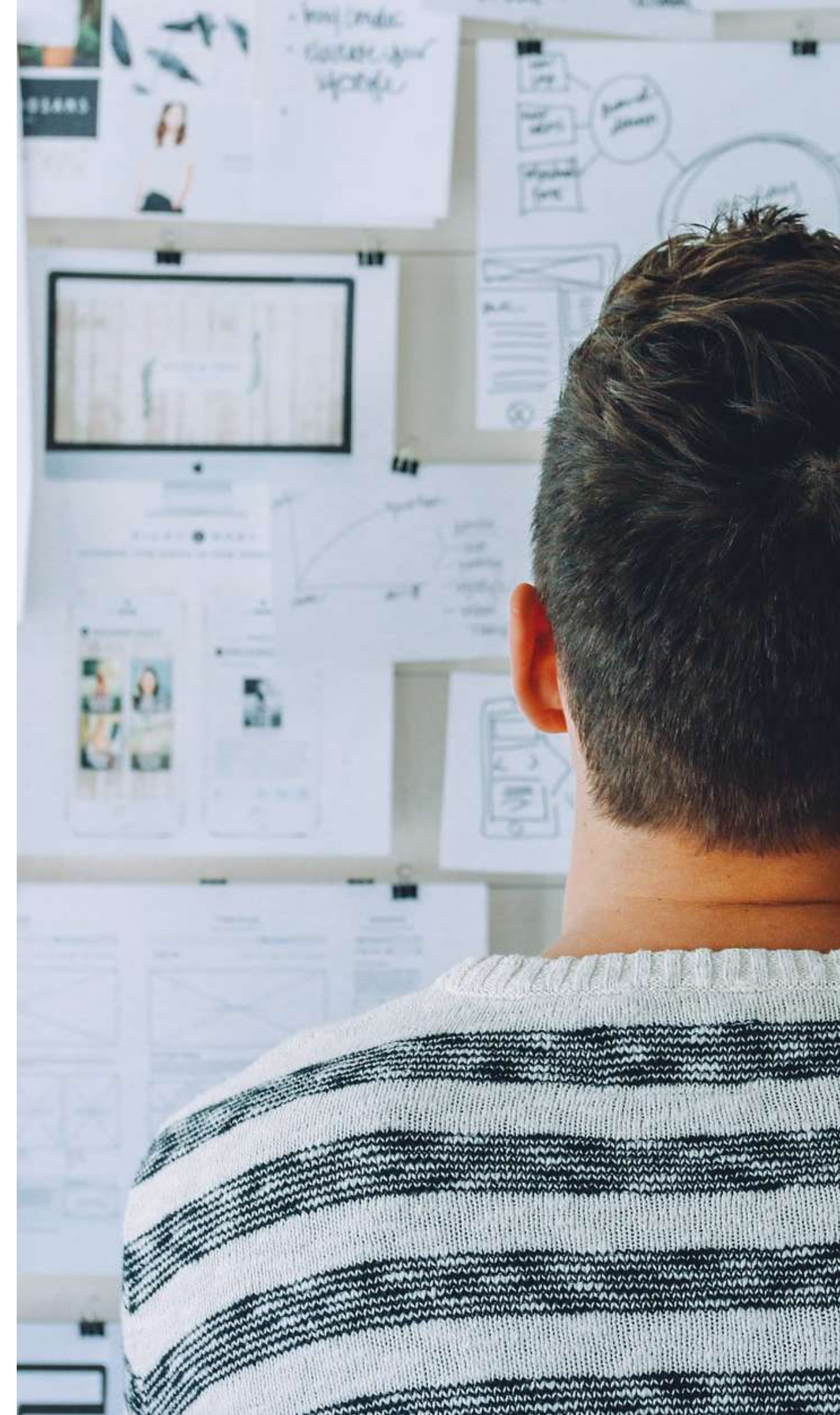
Existing and novel tech - workshops used both Soundbeam and new bespoke instruments



Thick Description - written up from notes and observations: telling a story

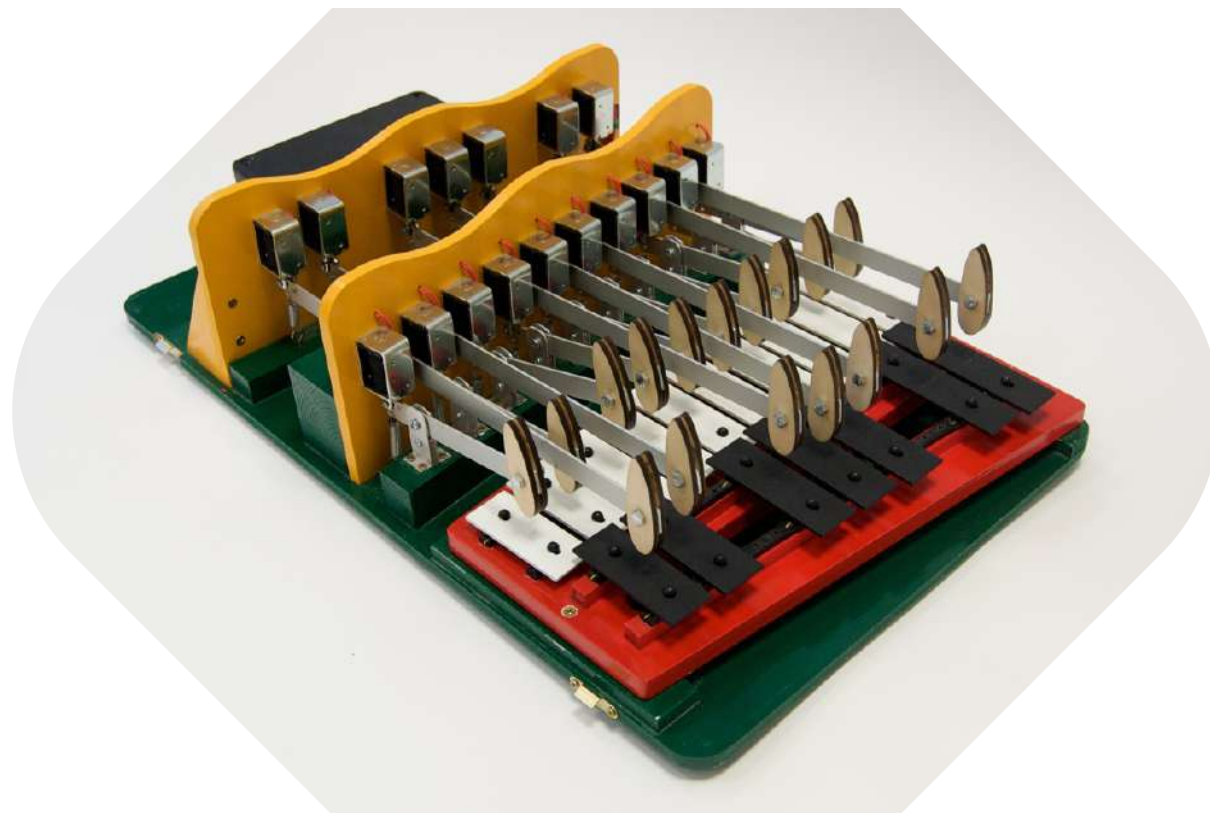


Grounded Theory Methods - on both interview and video data

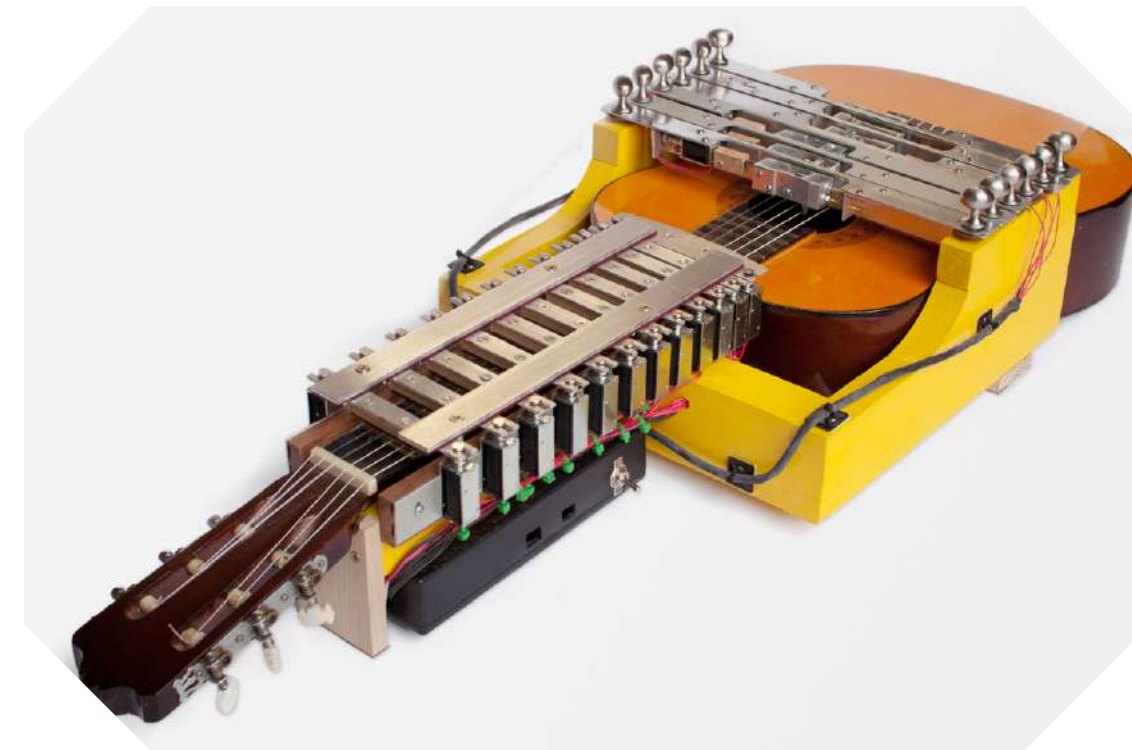


The Instrumental System

FEATURING



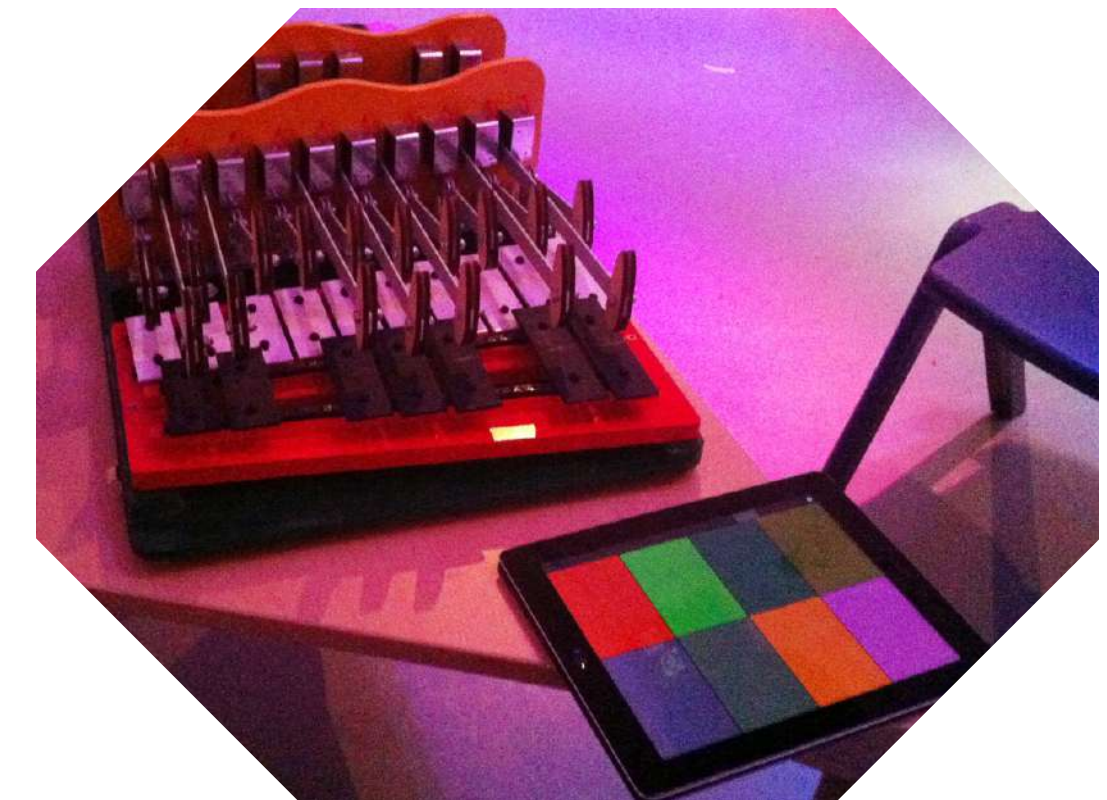
Glocko



Guitar



Beater



iPad Interfaces

Workshops

28 workshops over 2.5 years

Between 15 and 40 minutes

Between 3 and 8 students



Session 1: 10:34 Introduction (glockMasheen and guitarMasheen) : 30 mins
 Present:
 s002
 s006-s007-s009-s011
 s005-s009-s011

The purpose of this session was to introduce the students to two instruments, glock-Masheen and guitarMasheen. The instruments were set up by the researcher on two tables next to the computer workstation on the opposite side of the SMART interactive whiteboard. Staff moved students in wheelchairs around the instruments and also laid out chairs for s010, s005 and themselves. The spatial arrangement was in a crescent formation around the instruments, meaning that students were around 1-2 metres away from the point of sound propagation. The instruments were also close together, in order to allow space beside the entrance and the computer workstation. All students in wheelchairs stayed in their chairs throughout the session.

s010 was quite distressed throughout the majority of the session, shouting "NO!" repeatedly and screaming at times. This did seem to have an effect on the ability of all participants, including the researcher, in discerning the different sounds created by the instruments due to them being somewhat masked by the vocal sounds made by s010. She did play both instruments however, mainly using her right hand playing in four button mode and looking away from where the instruments were located. But after approximately fifteen minutes she was allowed to leave the workshop and shut herself in the sensory/soft play room.

s009 was able to trigger the interface in single button mode using his right cheek while the researcher or TA held the interface next to him. This meant that the young student, who only has voluntary head movement, was able to play a D major chord on an acoustic guitar using his face. The researcher was advised by the teaching assistants to position the interface in such a way that it was in s009's line of sight, this was due to his visual impairment. When the interface was near his face but not in his line of sight, he was less likely to trigger the instrument. Towards the end of the session the interface was placed on his lap and there was some involuntary triggering of the interface, as well as some co-active help provided from s006. There was a point towards the end of the session where

...the researcher and researcher met briefly before the session where the researcher demonstrated the instruments vocally to the students about the instruments. The researcher then demonstrated the instruments briefly before asking who would like to try them first. All the students put their hands up and s003 helped the researcher select who would have the first turn.

s016 was the first to play and held the interface in his left hand while methodically triggering all the buttons in eight button mode. s018 immediately grabbed the guitarMasheen interface and played the buttons as quickly as he could. After a short time this caused the guitar to crash and it had to be restarted. s018 continued this mode of interaction on both instruments each time it was his turn. The other students would stand up and move towards the instrument they were playing and explore the different relationships between the buttons and responses from the instruments.

s014 was inquiring repeatedly about how it worked and seemed frustrated by the wireless connectivity. The students and researcher decided to test how far the range was so s014 moved towards the corridor entrance door whilst playing, the system continued to work and the student moved out of the classroom and down the corridor four to five metres more. The guitar carried on responding to his interactions and he returned smiling from the corridor, other students were also laughing and smiling at this point.

Generally, the students played for around two to three minutes each on one of the instruments. They then moved back over towards the central classroom tables where they played on iPads, with two students being asked to return and explore the instruments further. Some students refused and preferred to play games on the school's tablet computers, but notably s013, s014, s016 and s018 wished to return. s013 then proceeded to work with s013 on creating sequences of notes/colours using a small portable blackboard to write them down.

Towards the latter part of the session, the researcher left the class to interview s002 about the morning session as this was the only time in the day that she was able to take time out. During this time the guitar crashed again. When the researcher returned, the guitar was not functioning and s012 was nervous as they thought they had broken it. The researcher restarted the device and it resumed functionality, however the session was now at an end as the school day was finished.

The teacher suggested that in the following weeks, it would be better to take small groups of two and three out of the class and work with them, leaving the teacher to work with the

main class. This resulted in a pragmatic change to the structure of the study as there were only three instruments.

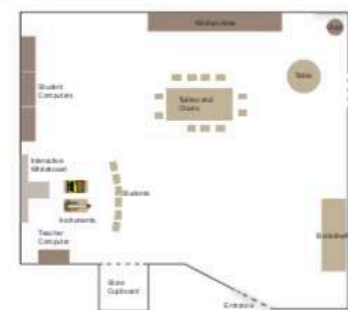


Figure 5.6: Floor Plan Class 2 Session 1

Class 1: 18/4/13

Additionally, when s011 changed interfaces to guitarMasheen from glockMasheen, his head and gaze immediately turned towards the drum.

s005 played for a sustained period of time with the drum, hitting the interface with both hands while laughing and smiling. Despite being on the opposite side of the playing area to the drum, s005 still appeared to engage with playing. He did repeatedly open the settings page on the iPad with his particular style of playing though, which did prove troublesome as either the researcher or staff member had to continue to reset it.

This was the first time s012 had been introduced to the system as he was taken out of the class just before the previous session. When it came to be his turn he had become very excited, so much so that he could not control his body and play the interface. He managed to undertake very few voluntary playing events, despite s007 holding his left arm and sometimes co-actively helping him play. His body started to sweat profusely and then he became very tired and his head began to drop. Afterwards, the feedback from the teaching assistants was that he was over stimulated by having multiple iPads and the instruments and did not necessarily know where to look at who was doing what.

After the session the researcher and teacher discussed ideas about how to integrate the narrative. The researcher talked about the different presets he had made and also offered to make a bespoke narrative from scratch. As the class theme for the term was underwater and the researcher had already made an underwater preset, the teacher decided that this

would be a good preset to use.

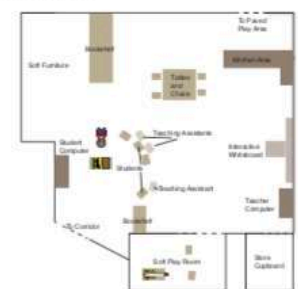


Figure 5.7: Floor Plan Class 1 Session 2

Class 2: 18/4/13

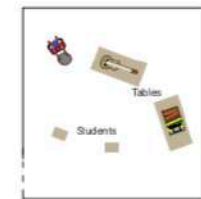


Figure 5.8: Floor Plan Class 2 Session 2

Class 1: 25/4/13

Session 3: 13:38
 Narrative Images: 28 mins
 Present:

s002-s007-s008-s011
 s005-s009-s011

The teacher and researcher met briefly before the session where the researcher demonstrated the images in the present. The teacher took notes of scenes and then throughout the session made notes about ideas for integrating the story into the sessions.

Due to a lack of staff and s012 being absent, it was decided that a single session would be undertaken rather than splitting the students into two groups. The instruments were set up in a line to begin with, in front of the SMART interactive whiteboard. The video output of the researcher's laptop was then plugged into the projector so that the images from the scene software could be projected for all participants without visual impairments, to see s005 and s010 sat on chairs approximately three metres away from the instruments and s011 was closer but more towards the side of class. They were once again in the crescent formation. This time however, no additional tools supplied by the school were introduced to facilitate further student participation. The first was a resonance board (which is a sheet of wood mounted on a frame. This means that students can be played upon the resonance board with a sound making device and it transfers the sound energy through the physical material vibrations in the wood to the student's body. This helps to increase the level of vibro-tactile feedback students experience from the music. s009 was laid on the resonance board at the

Thick Description

Written from notes and observations

Both prose and diagrams

Allowed the researcher to construct the narrative of each session



Grounded Theory Methods

This research used the methods developed and adapted by Cathy Charmaz (2006)

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. London: Sage Publications.

Open Coding

Assigning short inductive codes to text, audio or video data

Focused Coding

Beginning to group initial codes into larger categories and concepts

Axial Coding

Drawing out relationships between codes in their categories

Theoretical Coding

Examining relationships between higher level categories

Memo Writing

Actively wiring up any ideas/ thoughts/analyses you make during data collection and coding

[Click to edit](#)

COOL

t002

00:01:37.76
and that that does take usually a couple of weeks for her sometimes even more,
for her to yeah,

Dave Meckin

00:01:45.41
feel free to chime in with anything [...ta008 moving stuff....]

t002

00:01:52.54
um, so yeah I mean a lot of it does depend on mood of the children and um
obviously we didn't have s012 today

Dave Meckin

00:02:01.90
was he just off was he?

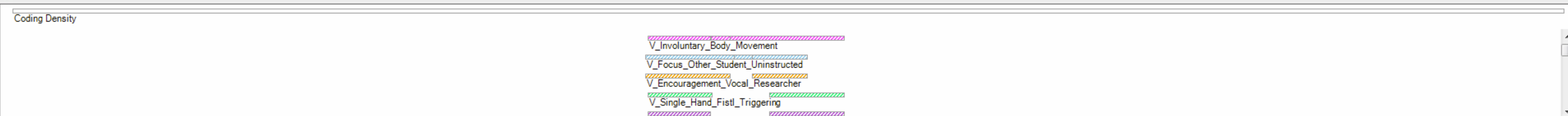
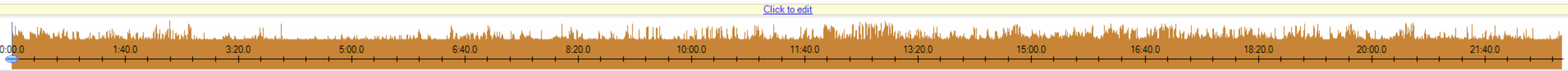
t002

00:02:03.41
off sick yeah, um I thought it was great having the instrument on the resonance
board today I thought that was really really good

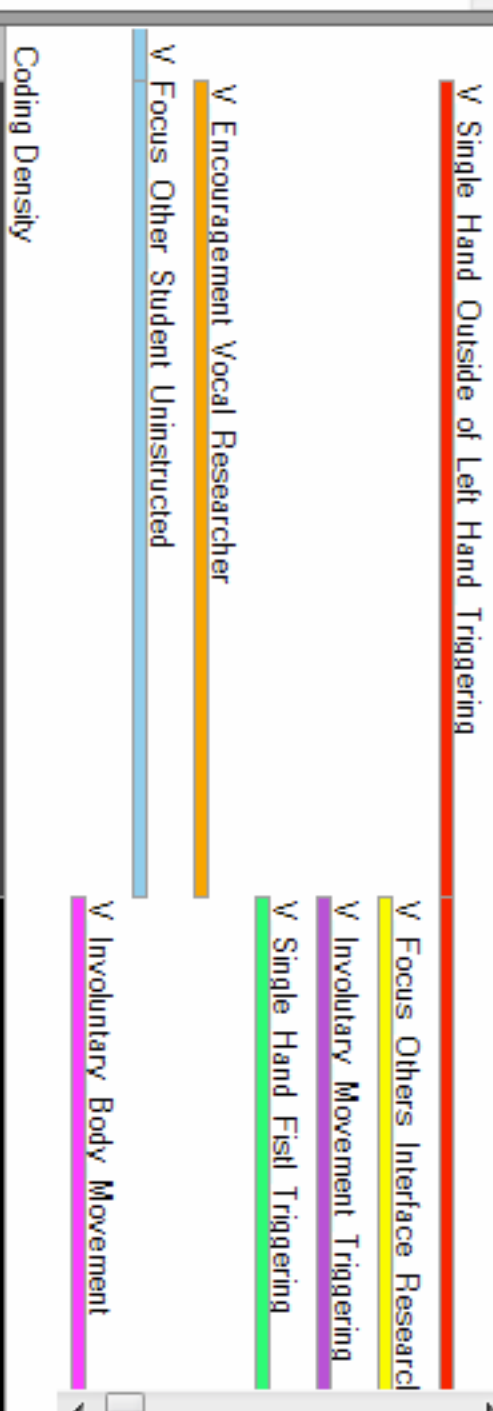
Dave Meckin

00:02:13.05
yeah

mood dependent
 Sonic_Affordances_of_Instruments
 referencing underwater narrative images
 using props to support narrative
 student abilities posing difficulties with turn taking
 robust interface safer for independent students
 images not working for blind and visually impaired students
 students understanding routine through repetition
 positive response from student to system
 iPad cases useful for robustness
 blind student only reaching once to instrument
 placement of wheelchair arm important
 Lack_of_Structured_Engagement
 assigning instrument to image
 adding more resonance boards
 Interface_Accessibility_and_Robustness
 Mapping_Complexities
 Narrative_Visual_Feedback
 Narrative_Visual_Feedback
 placement of instruments near students
 Balancing_Failure_and_Positive_Outcomes
 Session_Adaption_and_Suggestions
 Movement_and_Space
 Session_Logistics
 student off sic
 Ability_Variation_Dependencies
 positive response to u
 Positive_Engagement

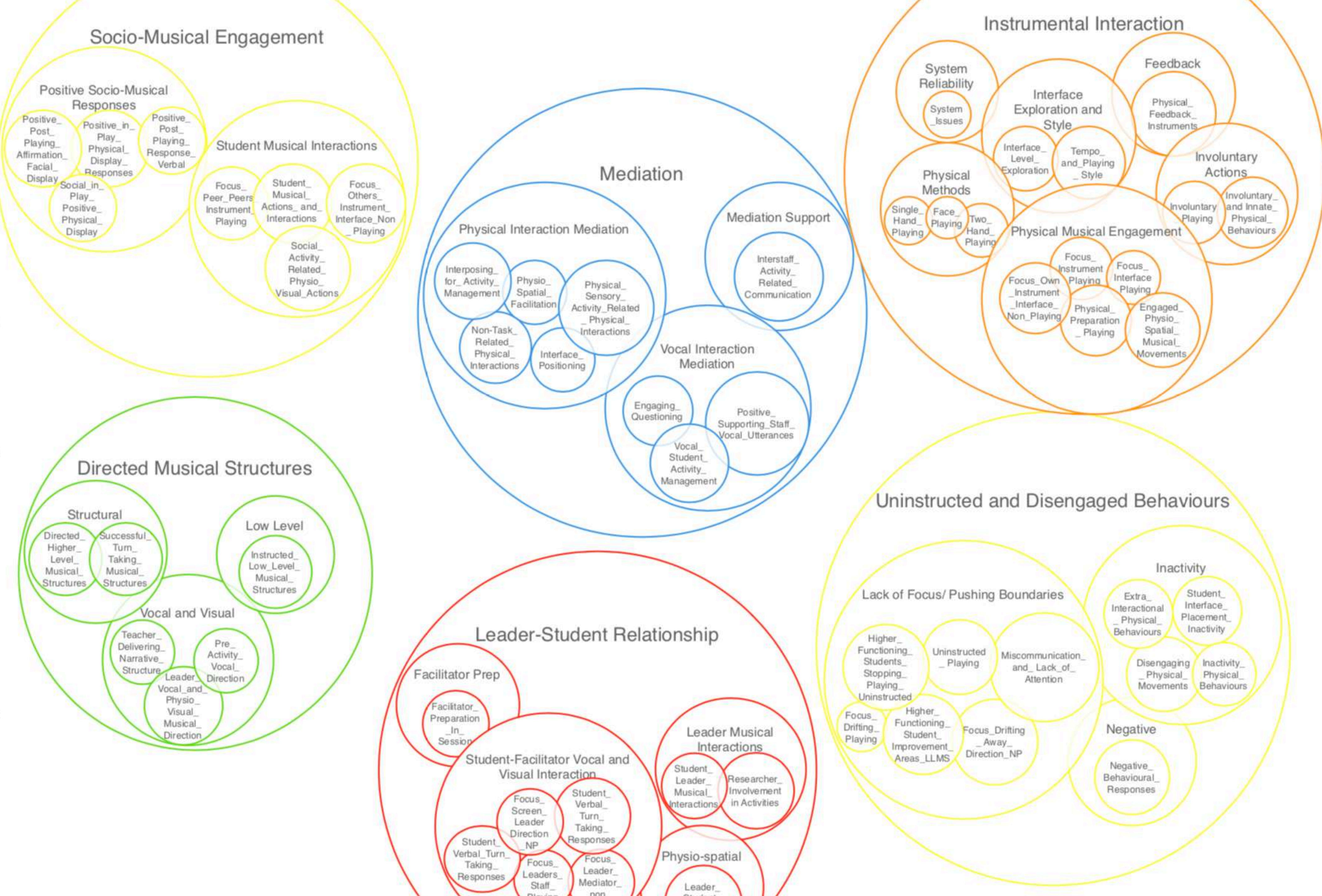


	Timespan	Content
32	10:52.7 - 11:40.7	s011 leaves hand on interface rapidly triggering single guitar chord. Focus away from instruments and interface on s010. Head drops but further rapid triggering is achieved through s011 moving hand to and from interface, triggering with outside of left hand. s011 smiles as staff laugh with s012 and stops playing. Then takes breath, lifts left arm and triggers multiple times. Focus away from instruments and interfaces ,smiling slightly. s011 triggers a double strike again. r: "heh yeah" researcher triggers glock in response, looking at s011. r: "look at me" gestures physically to himself s011 triggers double strike, focus on s010 to his right, not on researcher or instruments or interface. ta009 leans into line of sight of s011, he looks at her then back at guitar. smiles and triggers guitar 3 more times rapidly but then focus moves back to s010. s011 carries on looking at s010 and not playing for the rest of this section.
33	11:07.6 - 12:13.2	t002 repositions interface. s012's head has dropped but he is vocalising slightly. Head comes up and is focused to his right on researcher's iPad. Substantial amount of involuntary movement. t002 (yawns and looks around room): "you want to have another go s010? You want to have another turn? Watch she doesn't grab the instrument whoop" s012's head comes up focus over onto drum then head drops again s012's focus moves to researcher's interface as he passes it over to ta009. Head drops again. Outside of left hand triggers drum hit, possibly involuntarily. s012's head drops further with more involuntary movement. One more strike with clenched knuckle of left hand as right hand is put into mouth. t002: "Is that s010, s011? And s012's playing the drums, class band" s012's focus moves to interface. Body strains and focus remains on interface interface. After 7 seconds s012



In Nodes Code At

Figure 6.1: Grounded Theory Video Analysis Coding Table



Salient Findings



Salient Findings



Usability is an issue for all stakeholders

If new technologies are not easily usable or have a reputation as being so, adult stakeholders will leave them in the cupboard



Varied stakeholder understandings

Acting as workshop leader, teaching assistant and technologist allowed longer term connection with learners. Interviewing others gave insight into the lives of the adult stakeholders



Significant interactional mediation

Teachers and teaching assistants generally helped students with more complex needs a lot in their physical interaction with any instruments and interfaces



Flexibility is key

Instruments and systems should be designed to be adaptable to the dynamic and fluid environment



Importance of physicality in interaction

Touch and kinaesthetic perception appear to help students with more complex needs to identify sound-action relationships

Critical Reflections



Representation of Students



Time



Perceptions of Qualitative Research

