



# Questioning Potentials of the Electrorganic aFrame in Music Therapy: Two Client Case Studies with a Single Music Therapist

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**Abstract.** A multi-phase investigation was conducted to question potentials within music therapy of a new electrorganic frame drum musical instrument from Japan titled the ‘aFrame’. Two professional music therapists collaborated in this third phase of testing under the work in progress. One of the two music therapists tested the aFrame within numerous sessions with two profoundly disabled clients across generations i.e., an adolescent male and an adult woman. Observations including video recordings as baseline analysis. A goal of the study was to identify strengths and weaknesses of the new instrument in the field of (re)habilitation, especially across spectrums of those with profound dysfunction, special needs situations, and across ages. A goal of the overall work of some four decades, titled SoundScapes, is to achieve an ultimate compendium of tools for human performance to create specific interactive environments to support therapists, caregivers, and for own self-training through engaged and motivated creativity, self-expression, and play. Such environments as created by the first author have been used in his stage performances and installations (e.g., at Museums of Modern Art). The tools are thus considered transdisciplinarity forming a new holistic approach aligned to his six patents. Results from the investigation question the contextual potential of the aFrame due to a typical lack of motoric control aligned to the fragility and expense of the instrument – challenges were evident for those with diminished or lack of physical limb control. To optimize use, add-on footswitches and pedals are recommended with the aFrame instrument. These give added options including remote switching and an audio streaming interface mixer for optimal Online streaming of instrument (and voice) that would have been especially useful during the Coronavirus pandemic so that the music therapists could have continued their interactions with clients remotely (i.e., beyond video conferencing quality). Alternatives to the aFrame are posit and selected from the new generation of instruments and pedals controlling digital media as presented at the end of the text.

**Keywords:** Control vs Non-Control · Music Therapy · Framedrum · Art in healthcare · Interactivity · Motivational therapeutic intervention

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The original version of this chapter was revised: An error in Figure 4 has been corrected. The correction to this chapter is available at

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## 1 Introduction

This research was conducted in Denmark, Scandinavia where welfare support for persons with dysfunction/disability is amongst the strongest in the world (see The Organization for Economic Cooperation & Development (OECD<sup>1</sup>) 2019 report where Denmark resides alongside France, Belgium, Finland and Italy in the top five). Denmark is also consistently top rankings on various measures of happiness and contentment (see the World Happiness Report<sup>2</sup>). To place into context the authors' profiles are shared first with example linkage to the field.

The first author has a history of creating bespoke healthcare/(re)habilitation/wellbeing digital media systems that are both flexible and modular to be able to adapt and best-fit to each individual client's needs, profile, and targeted treatment outcome by medical teams. He is not a music therapist but, as a senior academic, has researched alongside therapists, psychologists, neuropsychologists etc., at prominent clinics, hospitals, and institutions where his research was investigated under his leadership. The foci have been on human input and output, where use of alternative, especially invisible, interfaces that enabled gestures (volumetric, planar or linear) in space to empower all, no matter age, ability/dysfunction, or situation. The content of the created interactive environments has included multisensory stimuli in the form of sound, music, visuals, animations, video games, robotics, lighting and more. Each element of the human-centered digital media environment is selectable to realize personalized interactive communication systems.

The second author has three decades of experience in the areas of interaction design, play, and learning. Her research concerns the design and use of digital environments and their implications for social interaction, play, and learning. She has conducted studies in various settings, from preschool to primary school as well as in museums and (re)habilitation practices. She has a genuine interest in users' perspective, which involves providing space for people to elicit their voices. A current focus of her research is on therapists' and teachers' professional digital learning through a co-design approach. She is also researching what computational thinking and generative learning strategies in physical-digital play environments means in practice. Central to her work is a critical and human-centered stance towards how visions, theories, and frameworks shape the fields of design, learning, and innovation. Her key research interest is related to the areas of Child-computer interaction; Designerly approaches to digital play and learning; Generative and inclusive play and learning; Materiality and representation; Analogue-Digital environments; Computational thinking; Design of emergent technology; and Professional digital learning.

Related to this investigation, both authors were active in The International Music Computer Conference (IMC<sup>3</sup>) panel symposium on Non-formal Rehabilitation via Immersive Interactive Music Environments (Brooks et al. 2007 – convened and moderated by the first author) where a select international group of luminary notables in music/music therapy/digital media/and creative play interventions were invited. These

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<sup>1</sup> <https://www.oecd.org/about/>.

<sup>2</sup> <https://www.worldhappiness.report/>.

<sup>3</sup> The International Computer Music Conference 2007, Copenhagen, Denmark.

panelists were Dr Barry Eaglestone, Senior Lecturer in Information Systems at the University of Sheffield, UK; Dr Phil Ellis, Professor of music, University of Sunderland, UK; Dr Rolf Gehlhaar, Professor in Experimental Music, Coventry University, UK; Dr Luis Miguel Girão, Aveiro, Portugal and Coventry University, UK; Dr. Wendy Magee, Music Therapist, Institute of Neuropalliative Rehabilitation, Royal Hospital for Neurodisability, UK and Temple University, Philadelphia USA; Dr Eduardo Miranda, Professor in Computer Music, University of Plymouth, UK; and Dr Paulo Rodrigues, Professor at the Department of Communication and Art at the University of Aveiro, Portugal and leader of the Education department Casa Da Música, Porto, Portugal. Issues covered included on sound therapy and music therapy, musical topologies, brainwaves (BCI).

The publication opens with: –

Enabling interactive music-making for people with complex needs provides opportunities for them to knowingly become active agents in musical dialogues. Music technologies, sensitive to tiny or inconsistent gestures, enable self-expression, heighten self-awareness in relation to others and contribute to identity development on many levels. Thus, music technologies are understood as a motivational tool in wider rehabilitation and care of people with complex needs. Also, these tools have the advantage of being used independently by people otherwise heavily dependent, thus empowering and enhancing feelings of achievement. (Brooks et al. 2007)

The investigation presented in this contribution reflects the above sentiment and the two authors attempt to champion the direction commonly reached in discussions at the ICMC panel (and adjacent). Whilst much of our earlier work has been focused upon gesture control within invisible interfaces, this text reports on a tangible new instrument speculated to be worthy to introduce within music therapy and related interventions.

This contribution follows on from the authors' prior publications as aligned to their brief profiles shared above, and especially those on music/computer music/music therapy/play. This text reports on the third stage of the research where their earlier publications on the aFrame included an introduction for music therapists and others to the ATV aFrame electroorganic instrument ... (see Brooks and Boland 2021). The research question is on questioning the aFrame instrument in Music Therapy and related interventions.

## 2 Background

The aFrame product is considered as 'A Next-Generation Electric Instrument Created through a Fusion of an Acoustic Instrument, DSP Technologies, and Traditional Japanese Craftsmanship'. The aFrame has built-in piezo-microphones and pressure sensors that send data to an in-built Digital Signal Processing (DSP) circuit. Sounds produced by the player's bare hands are picked up, processed and output by the DSP based on a proprietary 'Adaptive Timbre Technology'. The technology produces diverse tones by modifying the harmonic makeup of the signal input allowing various playing techniques. A player can freely play electronic sounds as if they're playing an acoustic instrument<sup>4</sup>.

<sup>4</sup> Abridged from <http://www.aframe.jp/story/>.

When the authors initiated their research (2018) by purchasing an aFrame, the Japanese company ATV, who produce the instrument, informed that the instrument had not been used in music therapy (MT) and there was therefore no literature on the unit in such use.

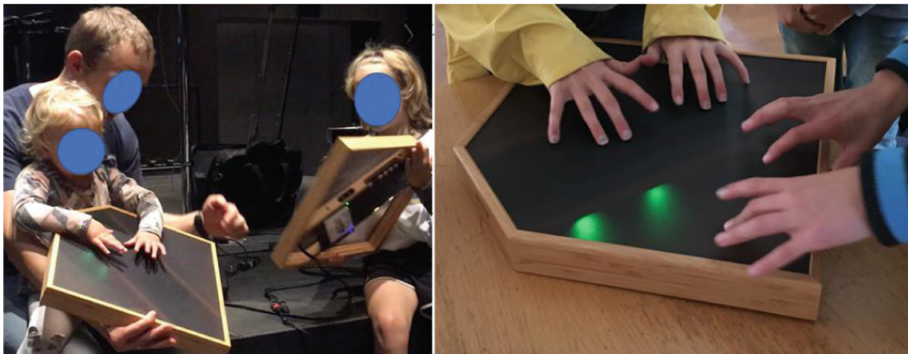
The authors presented their aFrame concept at the ArtsIT international conference when hosted in Braga, Portugal in 2018 and immediately following conducted a non-formal introduction at a residential complex in the Algarve (southern Portugal) for care staff, management, and leaders. The presentations were in line with existing literature and the first author's first-hand experiences of drum circles and their societal benefits when touring in South Korea as a musician. It was as if every village, town and city had communities of percussive activities focused on the different drums innate to their traditional musical culture. "Dropping into/happening upon" such activities one could witness all ages and all walks of life drumming away alongside each other, no hierarchy or judgement of others was evident – and not just a simple 4/4 or 3/4 pattern such as typical in western music. The rhythms were complex such that engagement, focus, and concentration alongside physical aptitude was needed. An article by Rodriguez (2018) informs how such use of drum circles can help in the following areas:

- Reducing tension, anxiety, depression, and stress
- Boosting the immune system and increasing energy
- Controlling chronic pain
- Releasing negative feelings
- Making social interactions and feeling a sense of community
- Improving language
- Improving joint mobility, posture, and motor skills
- Providing self-realization
- Releasing negative feelings and emotional trauma (Rodriguez 2018)

Relatedly, The Washington Post in an article<sup>5</sup> titled 'Seniors with dementia express themselves, connect with others in drumming circle, reflected on sessions by musicians run as a health and wellness program that uses "rhythm enrichment" to "brighten the day for seniors suffering from mental illness". The article stated how the leaders reflected – "It does tend to brighten them up, to make them more alert, more socially active /.../there is a distinct cognitive improvement /.../Music allows them to express joy, it allows them to express sadness. If they have pent-up emotions that they don't have a release for, playing music might provide them with an avenue to express those emotions." A professor emeritus of music therapy from the University of Kansas notes in the piece "Playing instruments can also bring back patients who have retreated from social life /.../They can get people to play together who can't even talk to one another/.../It allows them to build community – with each other and with family members. /.../ Rhythm can also facilitate ambulation in stroke victims and those with late-stage dementia where the motor center of the brain is directly affected by rhythmic auditory cues which can help sedentary people start walking again."

<sup>5</sup> [https://www.washingtonpost.com/local/seniors-with-dementia-express-themselves-connect-with-others-in-drumming-circle/2013/06/19/a806f5f2-d842-11e2-a9f2-42ee3912ae0e\\_story.html?utm\\_term=.10457b13f255](https://www.washingtonpost.com/local/seniors-with-dementia-express-themselves-connect-with-others-in-drumming-circle/2013/06/19/a806f5f2-d842-11e2-a9f2-42ee3912ae0e_story.html?utm_term=.10457b13f255).

The Algarve care home was clearly not interested in anything alternative that offered wellbeing, enjoyment and fun for the aged residents to upset their traditional approaches. However, on return to Scandinavia, there was an interest from a presentation at a large Swedish schools' event. Subsequently, to accompany the first author's research presentation at the 11th European Music Therapy Conference in June 2019 in Aalborg, Denmark he and the second author organized an exhibition and workshop in the city's Music House venue (Fig. 1).



**Fig. 1.** Top: EMTC2019 MT delegates testing two aFrames at the exhibition/workshop. Bottom left: A father (professional drummer) testing two aFrame instruments with two of his children at the Danish Science Day 2019: (Bottom right) Two children actively explore the aFrame whilst it rests on a tabletop (Danish Teachers Day 2019).

### 3 Exposures to the aFrame: Music Therapists, Musicians and Families

The exhibition and daily workshops at the 2019 European Music Therapy Conference ran the entire five-days of the event to expose the delegates and other visitors to the aFrame. There was great interest as MTs from around the world jammed together at different times in the exhibition and workshops space (e.g., Fig. 1 top). From this, contacts to numerous MTs were in place including locally interested, two of which were approached and loaned an aFrame for this research study.

Following the Music Therapy Conference, a presentation was made to teachers at a day seminar in Northern Denmark, and then a week after that, as a part of a three-day science fair another exposure of the aFrame was given by the authors for the duration of the event (e.g., Fig. 1 bottom). All videos of the testing were analyzed.

### 4 Music Therapist Clinical Improvisation Versus a Drum Circle

Music Therapist Gardstrom (2007) informs the difference between clinical improvisation (as used in MT) and a drum circle.

A drum circle is a community-based experience wherein participants self-organize, self-select, and create in-the-moment music as a form of both self-expression and community. It is the participants who decide why and how they participant, whether or not a facilitator is present. This is not how music therapy works.

Clinical improvisation is the process whereby the therapist and client(s) improvise together for the purposes of therapeutic assessment, treatment, and /or evaluation. In clinical improvisation, client and therapist relate to one another through the music, and the improvisation results in a musical product that varies in aesthetic, expressive, and interpersonal significance. This is how music therapy works (Gardstrom 2007).

Das (2017) in a text titled “Nine Reasons to Stop Using the Term *Drum Circle* in Music Therapy” also posits a position of denial against use of the term<sup>6</sup>. In his text he relates flaunting hippies dancing around a bonfire stating that “the stigma of the drum circle as a counterculture ‘psychedelic music jam session’ remains to this day”. Attending the 2019 MT European Conference as non-MTs, and one as an ex-professional musician, now a senior researcher, it was witnessed by the authors how many of the delegates who were professional or academic music therapists being very happily ‘tie-dye-clad’, singing with gusto along to the jam improvisations accompanying the welcome reception and meals that included a forest excursion where there was dancing around a fire with ‘Kumbaya Eyes’. Reflecting Das’ (2017) position that some may suggest elitism where the writer clearly had not experienced such a culture of shared drumming as available in South Korea and likely elsewhere in Asia and Africa.... And as practiced in symposium gatherings such as experienced at the Integrated Medicine and Expressive Therapy event at the Omega Institute from 1999.

<sup>6</sup> <https://kalanimusic.com/nine-reasons-to-stop-using-the-term-drum-circle-in-music-therapy/>.

## 5 Playing the aFrame

The ATV company that produces the aFrame instrument refer to their sound processing on the instrument as utilizing ‘impulse’s harmonic composition’ originating from timbral equalization incorporating splitting the original sounds into spectra and using a filtering algorithm. But what is the experience of playing the actual instrument?

Experiences of playing the aFrame electroorganic instrument for the author, who has been a professional musician performing internationally, relate to its sensitivity of playing response; range of pre-set sounds available to explore; and ability of the synthetic polycarbonate surface (or drum ‘skin’) to be manipulated to create tonal variations to a selected patch.

Notably, the sound patches/banks are non-MIDI, the aFrame is not a mere combination of sound sources and pads as MIDI interfaces/instruments. There is no delay or jitter experienced when one performs on the instrument, thus positioning the aFrame as an instrument responsive to traditional percussion instrument playing techniques.

The instrument has inbuilt high-performance piezo-microphones and pressure sensors inputting to sophisticated digital signal processor circuitry. This combination is cleverly engineered to produce a multiplicity of sounds through modifications based upon attributes of the source signal (e.g., fundamentals and harmonics) to result in an array of tonal characteristics to realize an experience of playing suggested as beyond what MIDI instruments can offer through its triggering of pulse-code modulation (PCM) sound sources i.e., digital audio related to sampling rate and bit depth.

The human performance aspect of playing the aFrame thus incorporates opportunities for hitting, pressing, rubbing, and nipping the synthetic ‘skin’ playing surface as well as the bamboo wooden frame, thus opening for a more expressive playing and phrasing experience.

The system microphones can also, with care of feedback, be adjusted for sensitivity to enable utterance (voice/breath) input. These aspects of the instrument enable a wide range of performance for a wide range of players with different abilities in different situations. Because of this the author’s concept of the aFrame’s use within music therapy intervention for clients with profound impairment.

This short paper informs of two case studies of adult music therapy clients. Each individual client, one male (E) and one female (P), had profound disability including challenges of motor control.

The research study was conducted by two authors who loaned the aFrame instruments to two local professional music therapists to explore following the exhibition and workshop by the authors at the 11th European Music Therapy Conference 2019 as above. Input for this study was received only from one of the music therapists. The sessions were conducted in 2020 whenever sessions were possible in-between disruptions due to the Corona situation. Video recordings of sessions were the basis of analysis.

## 6 Case Study Approach

In these two case studies the therapist collected the data, and then the authors met them and discussed the interventions. The video recordings of sessions, which were first-hand analysed by the therapist and then by the authors, were accompanied by case study session notes reflecting the therapist's observations of both her own actions and of the client. The strategy from discussion with the therapist was to keep it simple.

Aldridge (2004) reflects how case studies are research strategies embodying rich empirical inquiries based upon empirical investigation. Yin's (1994) well cited interpretation is posited as, "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). Similarly, others (e.g., Gomm et al. 2000; Robson 2002; Stake 1995) interpret that "A particular case is identified and located in context, which may be social, temporal or spatial. It is the bounding of the case in a context that makes the case study a 'case' study – the case may be a person, several persons, a group or a situation. Because the case itself is specific, and the context bounded, some authors contend that it is difficult to generalize from such research. However, it is the very context-related feature of case studies that make the approach important for music therapy. Case studies relate what is being studied to real life situations and allow us to use a multiplicity of variables. In this aspect discussions were with the therapist on these points where context related to their regular sessions with the clients but changing to use of the new electrorganic instrument aFrame.

Aldridge (2004) further reflects that "Selecting cases is central to this approach as this selection is, in effect, the 'population' to be studied. The nature of that selection will also color the study; selection on theoretical grounds will offer a different view from when the population is determined solely by the situation at hand. In the qualitative research literature, there is an emphasis on determining which sampling method is to be used. Many of us must be content with the people that we meet in practice as the population of our sample and I would like to introduce the term 'reality sampling' here as an expression for choosing who, or what, is introduced into the case study." In this aspect discussions were with the therapist on who the clients should be, and this was at the discretion of the therapist who knew the persons who took part and liking for musical form with functional physical ability to create a "strike" action with potential beneficial outcome.

Gomm et al. (2000) say that the most important dimensions are those relating to the number of cases and the amount of detailed information. The fewer the cases that are investigated, the more comprehensive the information that can be gleaned. In Merriam's (1998) definition from education research, this comprehensiveness is reflected as '...an intensive, holistic description and analysis of a single instance, phenomenon or unit' related to field-oriented research (p. 27). In this aspect discussions were with the therapist to keep the numbers to two clients but multiple sessions with a focus on only the electrorganic drum being used.

What data are to be collected is the crucial focus of case designs. From an experimental perspective, where the data are fixed beforehand, then the data will be strictly controlled and the researcher will define the cases to be studied. However, some researchers will construct cases out of naturally occurring situations, as we will see in this analysis. In this aspect discussions were with the therapist on what data should be collected – for example immediately after the intervention session to record notes and to ensure the video recording secured for research privacy and for subsequent viewing by the therapist (thereby supplementing her notes with additional reflections on self-activity and interactions, and then by the authors for analysis. The analysis did not undergo an in-depth examination of correlations of inter-coder agreement or machine annotation of performance or using instruments such as Kappa coefficient/inter-rater reliability as the authors wanted the therapist to have an ownership of her work, input to the research from her observations, and to not be intimidated of scientific methods/instruments.

Yin (1994) suggests theoretical insights from case studies and case studies relative to their narrative form, including that “The point of these therapies is not so much to cure the individual as to develop forms of viable meanings.” Aligned to this position the video recordings analysis conducted in this inquiry questions the insight vision of using electroorganic instruments within music therapy that through their non-digital form can augment current practices with added meanings aligned to creative expression afforded and related efficacy i.e., the end user/client’s awareness of their empowerment via this uniquely responsive musical instrument relating viable meanings.

## **7 Music Therapist Use of the aFrame Instrument**

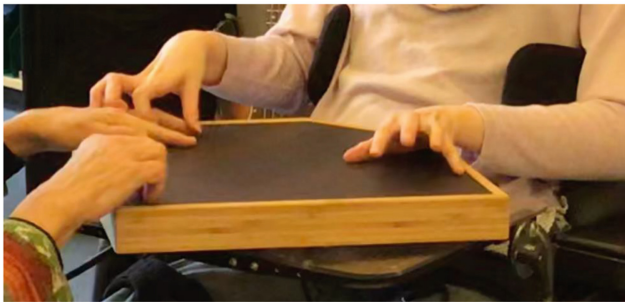
Images from the video recordings are shared in the following (Figs. 2a–j).

The music therapist self-analyzed the videos before sending both session notes and recorded videos to the authors. In her notes relating her own ‘experimental’ use of the aFrame many reflections were shared that informed this study.

The aFrame has small rotary knobs on the back side where volume is changed, and the MT expressed her preference for a pedal, thus, a simple five-volt stereo guitar volume pedal placed in-line with the audio signal to the mixer desk could be an inexpensive and available means for such control. The client could also have this on their tray as usually these pedals are robust being made for the rigors of stage performance use.



(a)



(b)



(c)

**Fig. 2.** (a) Therapist on left, client P on right – session start. (b) Therapist on left, client on right as they progress. (c) Client P grabbing the therapist's hand and using that connection to play – client's left hand begins to form the typical "push away" gesture that when against the side bamboo frame can result in the unit flying off the tray. Reflected as not intended by the client(s) just something that they cannot control. (d) Therapist on right - Patch changing = disconnect between therapist and client = not good as usually need continued eye contact and engagement. (e) No tray used. MT on right with the client on left. (f) A disconnect on patch change. (g) However, on this patch change (another session with same client but MT on the left, the client on the right) the client watched (likes lights) and continued engagement even though MT disengaged to change patch. (h) Here some good activity (MT on the left with client on right). (i) Here the "push away" reflex.... Whether to stop or wants patch change/doesn't like the sound? (j) MT looks like she considered the client was getting too aggressive with the hits so removed from range.



(d)



(e)



(f)



(g)

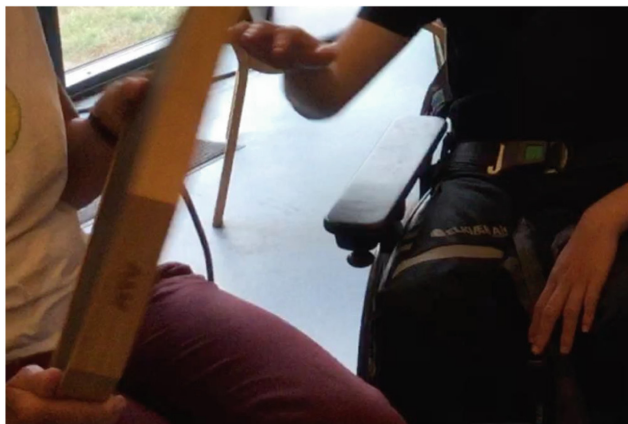
**Fig. 2.** (continued)



(h)



(i)



(j)

**Fig. 2.** (continued)

Similarly, the disconnect to the client and need to turn over the aFrame to change sound patches is not optimal. The video clearly shows the disconnect every time this happened. An add-on aFrame switch pedal that changes bank and patch is available as in the cited work (Brooks and Boland 2021, Fig. 3).

In the example images from the analysis, we restrict view to the aFrame and the MT and client's hands because of GDPR respecting participant's privacy and identity.

## 8 Conclusions

The intervention analyzed in the video recordings did not seem as a clinical improvisation as many MTs determine differentiate their profession. The intervention was thoughtfully conducted and improvised more towards exploring the new instrument and to see if it was something that could interest the client.

Following the prior research phases of self-testing and this most recent fieldwork, the aFrame is too large and fragile for these user communities. The MT could be seen in the videos as constantly stressed with trying to keep the instrument safe and ensuring the client did not push it onto the ground. A Magic Arm assembly often used in the field of special needs was suggested in discussions but the aFrame is still too large and a maximum size recommended would be more along the lines of a traditional tambourine's dimensions.

The experience of exploring the aFrame also seemed lacking in that there did not seem to be a distinct set of pre-sets that were worked through but more a random selection of sounds. This is not a surprise as many such therapists have only limited time to explore new instruments before introducing into their practices. We have seen this across the industry where new 'gadgets' become available, yet leader and therapists tend to stick with the traditional tools they are used to. In many instances this results in such 'instruments' being left in a cupboard unused.

For optimal intervention and engagement with the client, it is necessary for the MT to maintain engagement including direct eye contact to prevent a feeling of disengagement. Such disengagement was as evidenced in the videos when the MT was changing patches aligned to the lack of pre-sets planning. Thus, a footswitch is recommended as an add-on to enhance the system for this field of use (Fig. 3). Patch change could also be controlled by the client in this way or with an auxiliary switcher (such as in right image) according to user's dysfunctional profile (so whether head, hand, foot switchable). It would also improve a therapist's situation if the leaders were to give time for them to explore such 'instruments' and 'gadgets' before adoption and uptake.

In line with the above conclusion of using external switches to change the aFrame patches (sounds), there is also possibilities, as stated in Brooks and Boland (2021), to explore effect pedals such as loopers, and more (e.g., Figs. 4 and 5). There are also many potentials in routing the aFrame sounds to a computer where the sounds are further processed. In this case it is IK Multimedia products that were tested and are recommended i.e., iRig Stomp, iRig Stream Pro, and iRig 2. These devices are built to be tough and much less likely to get damaged as the aFrame instrument. In the case of the former, the iRig Stomp, it is a robust pedal assembly that accepts line signal (sounds from an instrument or voice) for processing on a tablet, phone or PC. Thus, the sounds can be



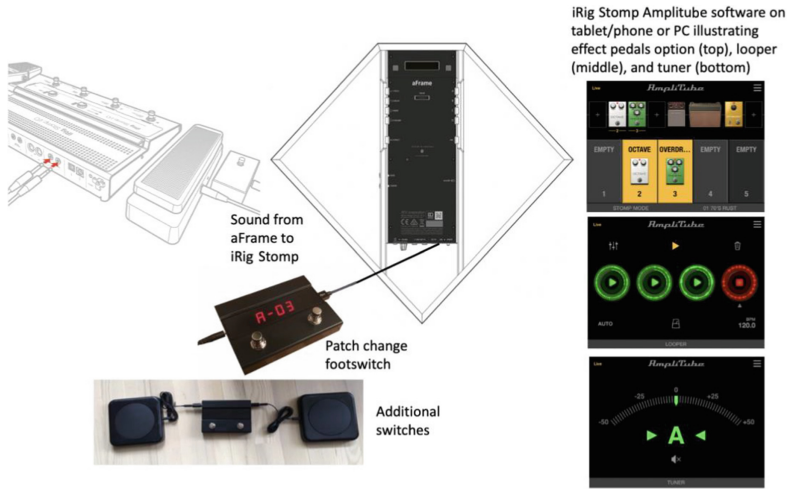
**Fig. 3.** (Left) Optional aFrame switch = bank and patch change of sounds [with permission ATV] (right) supplemented with two adaptive switches each side for easier operation by users having hand weaknesses. These are input-output devices that allow individuals with physical disabilities to independently activate devices such as the aFrame

changed and recorded as loops to play along with. The second product, the iRig Stream Pro, allows a live streaming of mixed audio signals between locations so that one client (and MT) can be in one location and another client (and MT) in another. This could, with family assistance if needed, be set up so that the client can be at home and the MT at her place of work (or home) such that when Covid restrictions prevented interactions a MT work could have continued remotely to the client. Whilst this is speculative and wasn't tested in this study, all components would seem in place to permit such interactions towards continuing client wellbeing interventions even in an epidemic situation. The iRig 2 third product tested is an interface that enables instrument and voice routing to phone, tablet or PC. Images of these products are below in suggested configurations (Figs. 4 and 5) – however, these are open for end-users to explore.

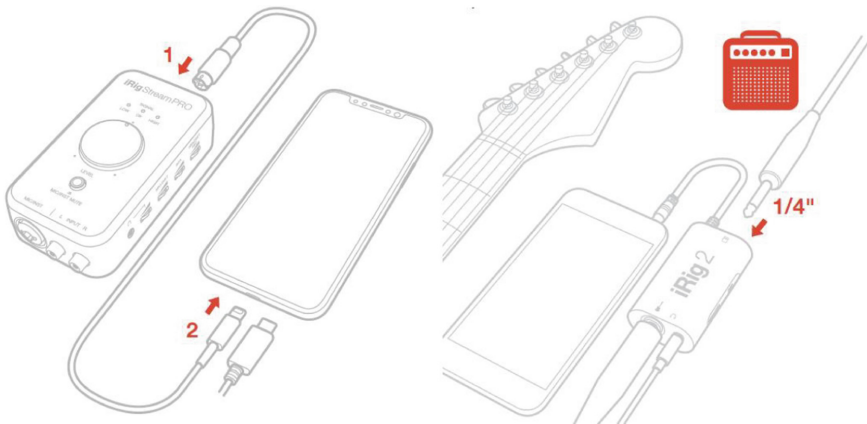
## 9 Expressive E Touché

Another contemporary interface that has proven to be robust and noteworthy within the research is the Expressive E Touché (see Fig. 6a, b).

Contemporary hardware interfaces in music offer new 'ways for humans to perform' via preferred actions beyond traditional. The Touché by Expressive E is a multi-dimensional desktop hardware controller product. With advances and availability of personal computers many such hardware has programmable graphical user interfaces to determine software components to easily adjust the use parameters or sensitivity/travel etc., as well as auditory characteristics of a selected sound – or even to create a sound from scratch. Fig. 6a and b illustrate the Expressive E Touché/Touché (SE) hardware interface selected through its design innovation of empowering nuance of human performance control through subtle gestural motions that is considered impactful within such research considering human gesture training. This interface can control hardware synthesizers, other external devices, software such a VST (Virtual Studio Technology) plugins and DAW (Digital Audio Workstation) control parameters, as well as its own GUI (Graphical User Interface) (called Lié – see Fig. 7) where aspects of performance can be customized to an individual's preferences.



**Fig. 4.** iRig Stomp and routing options for aFrame (or other instrument) showing volume pedal, footswitch option, and software options (Amplitude effect pedals, looper, and tuner). Typically, a guitar, bass, keyboard e.g., ‘iRig Keys’, or microphone e.g., with IK’s ‘VocaLive’ software effects are source instruments. Gratis ‘lite versions’ are available of many such software. Images used with permission from IKMultimedia© + ATV©. Video examples online e.g., <https://www.youtube.com/watch?v=xMb4KTrFYMA>



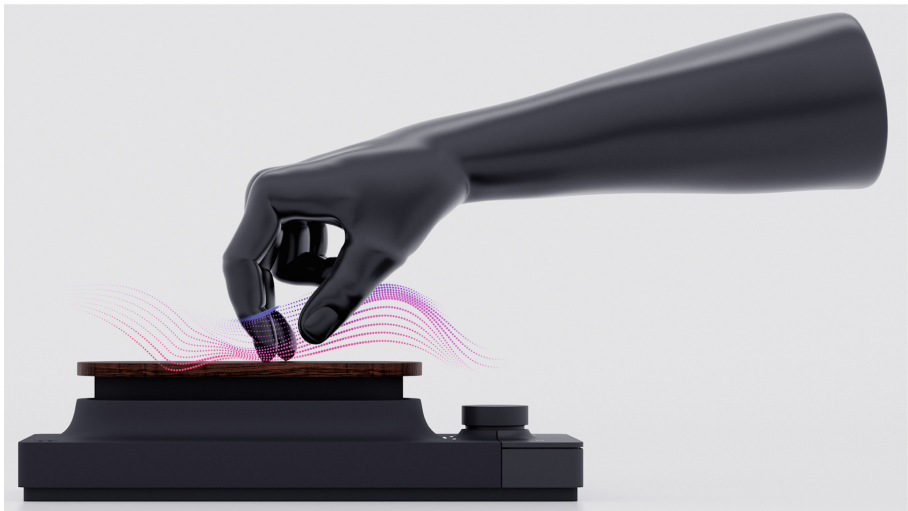
**Fig. 5.** Left: iRig Stream Pro for Online streaming instruments and/or voice via phone, tablet or PC; Right: iRig 2 instruments and/or voice input to a phone, tablet or PC. Image use permission IKMultimedia©

## 10 Summary

In summarizing it is worth the reader noting that there is numerous software that exhibit potentials to explore within such music-based studies and this constitutes future research. By this the authors have explored loop machines (layered music making where the

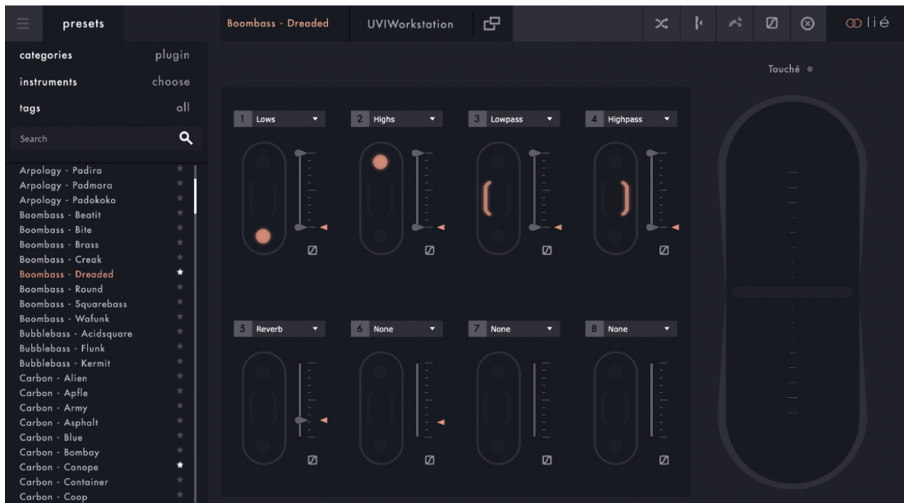


(a)



(b)

**Fig. 6.** (a) Expressive E Touché: four elevation views and bottom right illustrate adjustable control parameters under the playing surface (left) and with wooden playing surface in position (right) – with permission of Expressive E©. (b) Human performance subtle nuances using the Touché hardware interface (this also a way to train dexterity and haptic/tactile correspondences e.g., in acquired brain injury clinic intervention with a treatment program) – Source with permission of Expressive E©

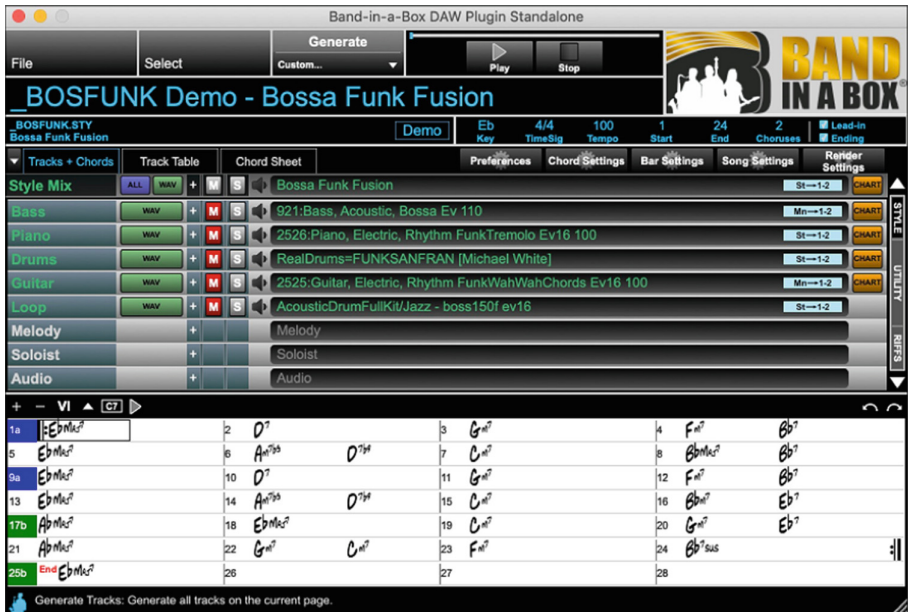


**Fig. 7.** Touché's GUI Lié soft synth enabling customizing of the hardware and mappings to software onboard sounds: permission of Expressive E©

client created their own backing track and then additional tracks are mixed in to create a whole tune – for example using a tool such as the iRig Stomp by IK Multimedia or similar). Backing track libraries are also available (these are like what many solo musicians use behind their playing or rehearsal where it can be just about any rhythm plus chord structure – some harmony – where the client then plays a melody. For example, a product called Band-in-a-Box® (commonly referred to as BiaB) by PG Music<sup>7</sup> Inc is an easy-to-use example that MTs (and others) are encouraged to explore where a wide variety of styles of backing music are available or can be easily created – in such cases the recording of the client playing with the backing music/loop acts as a tangible outcome from sessions, thus offering an added sense of ownership and achievement and success aligned to self-efficacy. The software also offers easy ways to compose one's own music just by typing in chord sequences, then choosing a style (e.g., Jazz, Country, Rock, Pop, Metal, Blues, Bluegrass, Dixieland, Folk, Funk, Americana, World, Gospel, and much more) and a desired tempo, that together is then performed within the software environment by session musicians rather than MIDI (though MIDI can also be used). This clever advanced playback system is empowered through PG Music 'RealTracks' technology where real musicians are performing one's own composition on real instruments making the software unique in playback quality. A 'player' such as in this study could then improvise a melody (tune) over the backing track with any instrument or even singing (or utterances if vocal abilities are limited). Resulting outcomes (created tunes/songs) recorded from sessions also can be an achieved 'product' shared with family and friends that motivates towards a next session iteration. A number of people/players of differing competences and abilities can together perform alongside each other within the Band-in-a-Box® environment....

<sup>7</sup> <https://www.pgmusic.com/>.

Band-in-a-Box® is also available as a Virtual studio technology (VST) Plugin for Digital Audio Workstations (DAW – many available in a lite version gratis). VST is a digital interface standard for connecting and integrate software audio effects, synthesizers and effect plugins with recording systems and audio editors. So customized set-ups can be created according to preferences. See Fig. 8 illustrating the Plugin GUI.



**Fig. 8.** VST DAW Plugin – Main Screen GUI with chords shown: permission by Band-in-a-Box® by PG Music©

It seems that these affordable and readily available commercial products are steered away from within music therapy education and practices and this a question that is needing asking as to why as it would seemingly be a way to enrich the music therapy intervention by offering increased opportunities for variety and achievements from sessions and programs. At a time when therapists are often expressing increasing workloads such support offered by such tools could be of benefit to client and therapist experiences. Given the impact of the Covid-19 pandemic (such as our MTs couldn't conduct sessions due to related isolation rules in Denmark) such tools that can be used between remote users (who may be isolating) to stream via the Internet to 'jam' together (e.g., Fig. 5) is seen as a godsent to give opportunities for enhanced participant/patient/client experiences and wellbeing. Whilst the non-MIDI aFrame drum was seen as challenging for the end-users, within the presented research, use of such digital media hardware and software interfaces, as presented in the second half of this text, has resulted in positive responses by participants and facilitators and can only be recommended for others to explore and adopt into their practices (for more see the authors' other publications in this field). The research continues.

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