UNIVERSITY OF AMSTERDAM

UvA-DARE (Digital Academic Repository)

From Music Therapist to Action Research Designer

A Narrative Account

Ragone, G.; Brulé, E.; Howland, K.; Good, J.

DOI
10.4324/9781003201656-16

Publication date
2024

Document Version
Final published version

Published in
Arts Therapies Research and Practice with Persons on the Autism Spectrum

License
Article 25fa Dutch Copyright Act (https://www.openaccess.nl/en/policies/open-access-in-dutch-copyright-law-taverne-amendment)

Link to publication

Citation for published version (APA):
Ragone, G., Brulé, E., Howland, K., & Good, J. (2024). From Music Therapist to Action Research Designer: A Narrative Account. In S. Aithal, & V. Karkou (Eds.), *Arts Therapies Research and Practice with Persons on the Autism Spectrum: Colourful Hatchlings* (pp. 182-194). (International Research in the Arts Therapies; Vol. 6). Routledge. https://doi.org/10.4324/9781003201656-16

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, P.O. Box 19185, 1000 GD Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (https://dare.uva.nl)

Download date:13 Nov 2026

Chapter 12

From Music Therapist to Action Research Designer

A Narrative Account

Grazia Ragone, Emeline Brulé, Kate Howland, and Judith Good

Introduction

Participation has become a key element in the development of technology to ensure its fair use (McCarthy and Wright, 2015). This is particularly true for assistive technology, which has a notoriously low uptake rate due to a combination of factors, including its often-cumbersome design, high price, and/or it not meeting users' needs or desires. In response to this, human-computer interaction (HCI) scholars have proposed a range of participatory methods for design and have even trained users in design methodologies in a Do-It-Yourself or Do-It-Together approach, leading to a growth in networks, organisations, and tools to support the development of technologies by disabled people, or disability professionals such as therapists (Hook et al., 2014). It is however difficult to bridge these two bodies of expertise, and even more difficult to ensure that the novel tools and interventions are appropriately tested (Brule et al., 2016). In this chapter, we outline one way to approach this issue: the interdisciplinary training of a music therapist, who, during her practice in music therapy, designed a touchless system that supports the music-making activity of autistic children with the whole body, and has subsequently undertaken academic research on the design and evaluation of this tool (Ragone et al., 2020).

Music therapy leverages music to achieve developmental, adaptive, and rehabilitative goals in the areas of psychosocial, cognitive, and sensory motor skills (Hurt-Thaut, 2009). It is becoming more common in educational services for autistic children, and those with behavioural and learning disabilities. Music is a distinctive area to assess perception, emotion, and other physiological reactions and neural circuitry of autistic people (Quintin, 2019), which is moreover enjoyable. However, for children who experience multiple disabilities, using a traditional musical instrument can be difficult, and can therefore prevent them from benefiting from the intervention; this is the first area in which technological innovation could be useful. Moreover, there are significant debates around understanding and measuring the impact

DOI: 10.4324/9781003201656-16

of music therapy on children; this is the second area in which technologies could be useful. These two goals cannot be achieved without the participation of music therapists themselves, but existing research rarely includes them as active participants (Ragone et al., 2021). This chapter provides an example and some explanations as to why participation is difficult, and outlines design opportunities for music therapists and technology researchers to pursue.

Study Approach

Analysing the researcher's experience is a way to understand the conditions of the production of knowledge, and to generate a qualitative and interpretative understanding of the activities they aim to change. This critical reflection on the researcher's experience (Mortari, 2015), which is crucial in action research, can employ several methodological approaches, such as narrative research, heuristic inquiry, or auto-ethnography (Andrews et al., 2013; Roth, 2005).

According to Schön (1983), the sum of what a practitioner knows is more significant than what they can articulate, a tacit knowledge that can be useful in research collaborations but is difficult to codify. The experience of our first author, as a music therapist first and a researcher later, represents here the research material as qualitative accounts written by the researcher, of her background and experiences past and present in the form of narrative research. This account is contextualised within her notes, in the shape of vignettes and the relevant literature, to highlight relevant methodological and theoretical insights into how her practice changed over time. While this type of narrative research is often conducted by the researcher alone, we have found it useful to collaborate on this account as a form of collective meaning–making that can further reveal the challenges of practitioner-led action research from the perspective of more senior academics.

Background: Music Therapy at the Crossroads of Music and Health

I have loved music since I can remember. When I was an adolescent, studying music was always the dominant option during conversations with my parents. For my bachelor's degree in Systematic Musicology, which I obtained in 2004, I delineated a path in my degree dissertation towards music therapy, which was still unknown and considered unusual in this context. Although different music therapy programs were operating in Italy, where I was living, there was a substantial difference between music-making approaches for practitioners in musicology and music therapy. Music therapy uses music to address non-musical goals, which can explain why it is absent from the musicologists' academic curricula, which is focused

instead on the theoretical aspects of music. I completed an internship at the Maggiore Hospital in Parma (Italy), working with patients with Alzheimer's Disease. Then, I moved to Rome to complete my master's degree in Music and Art therapy. Finally, I continued my practice at the San Filippo Neri Hospital with a group of people with Alzheimer's and Parkinson's Diseases. I could write at length about the extreme emotions of working with persons finding harbour in singing yesteryear lyrics from their youth as they were losing the ability to form short-term memories—as previously described by Sacks (2008) *for instance.*

Music is a relational experience, but this was not necessarily emphasised in Grazia's musicology studies. Music therapy was firmly kept beyond its boundaries, as a care practice. Care practices are often undervalued, perceived as messy and requiring little skill (Mol et al., 2010). Music therapy is similarly at the periphery of medicine. Music therapists focus on experiences that medical professionals may not have the time to address: the difficult emotions, being there rather than treating and healing. It is with this background that:

*I was then employed by the Rome city council, working in primary schools with autistic children in 2006. My approach to music therapy with autistic children was guided by my mentors: first a psychoanalytical orientation (*Benenzon, 1981*) with a later turn to a humanistic and psychodynamic one (*Stefani and Guerra-Lisi, 2006*). I ran weekly individual and group sessions and, by rotation, sessions with mixed groups of autistic and allistic*[1] *children to support social integration.*

According to *DSM-5* (APA, 2013), Autism Spectrum Disorders(ASD) are characterised by two core features: deficits in social communication and social interaction, and restricted, repetitive patterns of behaviour, interests, or activities. Additionally, and relevant to music therapy practice, Bhat and colleagues (2020) report that a significant percentage (87%) of the autistic population have motor difficulties, ranging from an atypical gait (gross motor skills) to difficulties with handwriting (fine motor skills). Other studies (Wilson et al., 2018) have demonstrated that autistic children present motor differences such as clumsiness, abnormal motor coordination, postural insecurity, and weak performance in standardised testing of motor functioning. Despite their robust presence and their negative impact on learning and social interaction (Green et al., 2009), motor issues are not considered a core trait of autism. Music therapy is attractive to autism practitioners because they often seek to support autistic children in developing social communication and interaction skills, and in some cases, motor functioning. Music therapy helps in supporting joint attention, social reciprocity, and nonverbal and verbal communication (Srinivasan and Bhat, 2013).

Developing as a Music Therapist with Autistic Children

After five years of working for the Rome city council as a music therapist and as a trainer for teachers to deliver music therapy sessions in various mainstream schools, the primary aim of Grazia's work was to integrate autistic children in their classrooms. Below are excerpts from her notes at the time, reflecting how Grazia and her colleagues conceptualised and assessed the impact of music therapy. To protect the confidentiality of the children mentioned in this paper, all the names used are pseudonyms.

> *As the small group of 6 floats into the room, where all the musical instruments are placed onto the floor, I welcome them with a melodic song calling each one's name. This is the 3rd session with the same group. The chosen instruments of the day are primarily rhythmic and two melodics. When Manuel arrives, he sits apart, not on the spot I assigned for him and far from the rest of the group sitting in the shape of a circle. I leave him watching us, although I continue to keep him in through gaze. We all play a 4/4 rhythm while I keep singing. Finally, he stood up and sat closer to the group, still not on his spot and apart from the group.*

At the time, the only way Grazia and her colleagues could evaluate the trend of the session and the therapeutic goals was via a thorough written report composed of summative feedback recorded during and after the session. Most of the notes came from the individual diary that therapists kept and could consequently share regularly with the rest of the team, made up of parents, teachers, psychologists, and other relevant professionals. In the analysis, Grazia always looked at specific features of joint behaviour, communication and interaction that would be relevant to the aims of the therapeutic process while also being comparable across different sessions. She noted simple, relatively unambiguous behaviour that can be coded, such as movements and face behaviour and rhythmic activity. In this third session, Manuel, for the first time, clearly showed his willingness to be engaged in our way of making music as a group. The overall intervention lasted 18 months including school holidays. Below is another extract of Grazia's notes from four months later:

> *Today we had a group of 8 children working with Manuel. In the room, I placed only two rhythmic instruments. On their arrival, after the welcome song, I asked them to move freely following me while I was playing a simple 4/4 rhythm. They were all synced after we started playing the 'Identity beat' game where one child per time had to move naturally, and the rest of the group followed them copying the movements. Children were having lots of fun, and when it came to his turn, Manuel was pleased that everyone else was following him; he was smiling, laughing, and*

jumping, experimenting with new, unusual movements, checking that everyone else was following him. Manuel still averted his gaze.

After a couple of individual sessions of music therapy, he started better articulating his words and started to sing and show his talent to sing in tune with any melody he heard. His echolalic expression became a strength.

The therapeutic goal was initially to support Manuel to develop his vocal sounds into spoken words through music therapy. But, by the end of the academic year, he showed great musical ability and the rest of his classroom learnt how to relate to him and respect the moments when he was upset or struggling with social demands. His verbal communication dramatically improved, and he was able to articulate specific requests. After a few sessions, he began to make sparse eye contact and interact, first with Grazia as his therapist and then with other children in his class. He loved to express himself through singing with the rest of the group but never showed any interest in playing musical instruments; sometimes he was even bothered by percussive instruments. Grazia often felt that he considered musical instruments to be intrusive. Even with the piano, every time he was asked to play, he would never press the keys for long.

Towards the Transition

While I was practising as a therapist, I was constantly researching new ways, through music, to address therapeutic goals with Manuel and other children like him. I had the feeling that music therapy, although having high potential for autistic child users, had a few limitations too. During my years of training and practice, I continuously exchanged opinions with other therapists and musicians and artists every time the opportunity arose to talk about music and its potential. I was still searching for new ways to practise music therapy and tailor it for larger groups, when in 2008, I came across a group of researchers at the Italian National Council of Research (CNR) in Pisa (Italy). At the CNR's developers' team, I put forward my idea of developing a new tool to practise music therapy, a contactless, invisible musical instrument, which at the outset I named ConTatto, that could translate each gesture into a sound, and a sequence of harmonic motions could generate a melody. ConTatto was implemented as a standalone application. It provided an immersive sensorial experience for the children who could feel themselves as being the source of sound in their free movements in space. We specifically designed a room at the CNR where there were no distractions, with white walls and with all cables hidden. The ConTatto system was based on an Apple Macintosh computer and consisted of a video camera, connected through a Firewire digitiser, that allowed a

latency of only one frame in the video processing path. The algorithms detected and extrapolated features from the child, such as spatial position, arm and leg angles, and speed, while an operator - in addition to the therapist - could link these features to sounds synthesised in real-time, following an agreed schema defined by the therapist. The technology presented a few limitations though, such as the influence of the ambient light to avoid shadows that could also affect the precision of motion detection. Also, the presence of another technician who needed to control the system, following my guidance as therapist, could represent a distraction for the child. Additionally, when there were last minute changes according to the child's reactions, it was difficult to exchange that information between myself and the technician, avoiding the child's involvement. At the time, I was not even aware of the existence of the HCI world.

HCI focuses on how people interact with computers and evaluates the extent to how computers are or are not developed for effective interaction with human beings. As a natural implication from its name, HCI entails the connection between the human user, the computer itself, and how they interact together. In the last decades, the use of technologies in the HCI field has expanded the ways people can make and experience music (Ragone et al., 2020). This led to the dramatic increase of motion sensing technologies that have become pervasive in so many fields including music therapy that needed to adapt itself.

However, at that time, I was still unconcerned that I was crossing the road between being a therapist and becoming a researcher in HCI. It took years to go through the process. While I still was a therapist, I always tried to stay informed by academic research and took any idea that could shape and ameliorate my practice. I was aware of how this kind of partnership could promote the significance, practicability, and value of research and the potential efficacy of care while being a therapist.

Grazia was interested in research on motor skills before becoming a researcher. Gestures bring both semantic and pragmatic content to communication (Capone and McGregor, 2004). de Marchena et al. (2019) showed how autistic participants have nonverbal tactics for regulating conversational dynamics to enable conversational turn-taking. The same study demonstrated that motoric features were associated with individual autistic symptoms. These theoretical backgrounds and other studies (Torres and Donnellan, 2015) which highlighted the importance of motor differences in the early years as moderators to predict a future diagnosis of autism led her to focus her attention on the motor aspect in the design of the new musical tool. Musical gestures and body motion in music have recently been

the focus of extensive interdisciplinary research from different disciplines such as musicology, cognitive psychology, neurology, and computer science (Godøy and Leman, 2010). New approaches to embodied music cognition (Leman, 2008) offered new perspectives and required a rethink of the relationship between the human body and musical experience.

During my master's degree in the School of Psychology at the University of Sussex, I analysed the first dataset collected, using an updated version of ConTatto, in a pilot study conducted in Italy with a group of 10 autistic children, aged 6 to 10 years old. It was a decisive step in the transition from being a practitioner to becoming a researcher. As a music therapist, I could not produce intelligible data reflecting the efficacy of my work. I thought technology could provide this data, which would in turn allow for clearer communication between researchers and practitioners. But I quickly realised that wearing both hats ran the risk that one role would become dominant. As a practitioner, I see my main goal as contributing to the client's well-being. In contrast, as a researcher, I see my goal as describing, predicting, evaluating, and understanding. Before identifying myself as a researcher, I had to bring the two perspectives together.

The Change in Perspective

I recall, during my practice, my experience with nonspeaking children whose body language was often more eloquent than words. As a music therapist, I was struggling to find an objective way to collect data and document my studies to make a wider contribution to knowledge. I needed to explore new methodologies and approaches to children and data collection when new visions were opening promising avenues towards new technologies. At the time myself and the team I was working with were still unaware of the existence of the Kinect for Xbox 360, which was subsequently presented in June 2009, it looked like the future of technology and the answer to my need in documenting a mixed-method approach.

*For my PhD in HCI at Sussex, I wanted to learn more about why music therapy was effective, and the role of movement in this. I also still wanted to develop ConTatto (which evolved into OSMoSIS), the tool I had envisioned when working with Manuel and with other children for whom traditional musical instruments led to frustration over not being able to make a nice piece of music as well as not being able to properly hold some instruments. In addition, I learned of research showing that autistic children might lack full awareness of their bodies which also affects their ability to self-regulate (*Schauder et al., 2015*). I then focused on ways of promoting self-recognition of own-body movements providing an interactive and playful space to enhance perception, action, and self-awareness skills.*

We designed an HCI system, OSMoSIS (Observation of Social Motor Synchrony in an Interactive System), which allows the sonification of dyadic coordinated human rhythmic activity and uses the Microsoft Kinect to accurately track and process body movements to enhance the child's body awareness unobtrusively. The name chosen, OSMoSIS, reflected the aim of a user-centric approach, where a process of gradual assimilation of ways to interact with others and express and communicate through sounds and body movements happens. OSMoSIS aims to enhance children's perception and provide bodily consistency through a simultaneous cross-modal mapping of body motion qualities from bodily movement to sounds. OSMoSIS, using Microsoft's Kinect camera, is not intrusive for the child and generates an interacting environment in response to the child's movements. One of the advantages, a requirement for its development, was to record the movements pattern of children to reflect their engagement during the session. This signed a significant advancement due to the adopted Kinect technology's ability to analyse in detail the 25 body joints of the child while they interact in the interactive space. Also, it addressed one of the needs of the therapists to generate intelligible data reflecting the efficacy of the interventions.

OSMoSIS was designed to prioritise ease-of-use and simplicity, addressing one of the significant issues encountered in the music therapy practice where some instruments, such as the guitar, can sometimes be too complicated for those with cognitive or physical impairments, limiting their scope for expression (Magee, 2006). OSMoSIS represents a new way to practice music therapy where children do not encounter barriers to music-making but express themselves through sounds as a vehicle of interaction, social and emotional development without the necessary involvement of verbal communication, aim of the music therapy.

With OSMoSIS, Grazia has run three studies with three groups of ten children each. Each study had a similar design in terms of interaction where, in four 1:1 sessions, the researcher proposed four movements associated with four sounds with specific characteristics. In each session, Grazia presented four movements (hopping, marching, waving arms, moving the whole body) associated to four sounds (waterdrop, drum, guitar, marimba) to the children who were asked to mimic her movements. The sessions were divided into two conditions, where Grazia proposed the same movements with no auditory feedback in the first condition or associated with sounds in the second condition. For instance, the 'hopping' movement was associated with the waterdrop or the 'marching' with the drum. In summary, we noticed a higher level of interaction between the children and the facilitator with the system active. The main difference between traditional music therapy and the new music interdisciplinary HCI approach consisted in the absence of mediators such as instruments to free up children's expression and creativity. With OSMoSIS, children's bodies act as musical instruments and the more they move, the more sounds happen around them. The lack of the embodied

phenomenon that traditional instruments offer needs to be weighed against the potential for the user to participate actively in making sound within a therapeutic communication. With this new perspective, gestures are not seen as a means to control musical instruments which generate sounds but rather as a further significant agent to the formation of musical meaning.

Today, with Kinect, my research is still ongoing, and it is not the goal of this paper to offer comprehensive evidence about the efficacy of the approach with OSMoSIS. However, my studies and analysis so far have identified promising benefits, and several avenues for further research.

Advantages and Disadvantages

The first author's transition from practice to academia required her to move away from applying existing theories, waive some aesthetic principles regarding the choice of sound, and to following scientific methods, starting from measurable predictions, testing them through empirical studies, and finally to objectively determining whether the results support the hypotheses. One of the limitations associated with integrating technology into the new music therapy approach is often a lesser aesthetic musical experience than with acoustic instruments, since sound is generated by MIDI sounds triggered by a switch or a sensor. Traditional musical instruments elicit evocative capabilities due to their multisensory capacities, encompassing several senses such as sight, touch, and smell in addition to sound. This represents a significant limitation for music therapists for whom the search for aesthetic and harmonic properties in sounds is always an important challenge in music making. Also, even more when designing for autistic users, the choice of sound features such as pitch, timbre, and dynamic should be very accurate because of heightened auditory processing in autistic people (Heaton, 2003). In the OSMoSIS design process, it took a long time to find specific sound features to match with simple gestures and which were pleasurable and not difficult to process for autistic users. After the first study we refined sounds as we noticed some sounds were not well-suited to our users.

Before running the study, I asked to know everything about each child and their experience with particular sounds, but no warning was given to me about any specific issue. I began the data collection with Flo using the guitar sound, and he started interacting with me straight away, mimicking my movements and displaying enjoyment in what he was doing through smiles, eye contact and verbal utterances. The second sound was the 'water flow' associated with a sweeping motion, with the arms pretending to pull at the water. I was showing my arms moving backward and inward when suddenly Flo withdraw himself, moving toward the corner. His face expression became sad with lowered eyelids, downcast eyes and

slanting inner eyebrows. I soon interrupted my exercise and switched off the OSMoSIS software which was still generating flowing water sounds according to my movements. Flo asked me to go back to his class. The day after, parents reported to the SENCo that Flo had previously had an upsetting experience while he was experiencing outdoor activities at the river. For the following studies, we used this experience to improve the sound quality and were careful to ask each parent for any suggestions about the use of specific sounds with their children.

Therefore, the control of sound, the choice of colour, and purposeful design are essential components in designing a setting for autistic children due to their different sensitivities to the environment. In addition, attention to the sound features would be essential to design therapeutical settings, to avoid causing distress or anxiety to participants. Also, the use of technology in clinical practice remains a topic that has been insufficiently researched. A lack of training in the appropriate use of technology in music therapy and access to technology equipment remain the most significant barriers for music therapists. An interchange between researchers and practitioners could establish a framework for developing technologies that can be tailored and used to a client's benefit within clinical care. Each field of practice has its own requirements for matching the user's needs to the technology's features. For instance, music therapists working with adults with neurologic conditions have reported that technology has improved arm movement in people with hemiplegia (Paul and Ramsey, 1998) as well as being useful in facilitating active participation in therapy (Nagler, 1998). Other studies (Hunt et al., 2004) also outline the value of technology in motivating adolescents to engage in therapy. OSMoSIS, with its autism-centric approach, seems to respond to the needs of autistic people; they are able to gain awareness of their bodies through sounds that react in real-time to their movements, supporting their self-regulation.

Conclusion

Technology design's key success in music therapy needs to be user-centred, addressing client's needs. Although acoustic instruments will still be the preferred tools for music therapists, these instruments cannot always support complex physical needs in such a flexible way.

Although communication between practice and academia still results in largely unresolved issues in design research, technology can provide opportunities promoting the interchange of knowledge and abilities. This narrative research chapter has shown the usefulness of collaboration and cooperation as a form of collective meaning–making that further reveals the challenges of practitioner-led action.

From the stakeholders' perspective, we suggest designing users' tools and testing theories as a collaborative process that aims for transdisciplinary understanding. However, it would also be helpful to bridge the two bodies of expertise of academics and practitioners, allowing appropriate testing of novel tools and interventions. This chapter has outlined one conceivable way to approach the issue: interdisciplinary therapist training.

The advantage of technology, in providing automatic or manual post-processing and mapping data to a model, is that it makes it easier to develop and share evidence-based practice, potentially leading to a good research-practice partnership.

Note

1 Allistic is based on the Greek word 'allos', meaning 'other', just as 'autos' (in 'autism') means 'self'. The term is widely accepted by the autistic community in opposition to "neurotypical" which implies that someone is intrinsically better or worse. Also, in this work, we use identity-first language (e.g., autistic people) as opposed to person-first language (e.g., people with autism) based on established or emerging preferences within the autistic communities.

References

Andrews, M., Squire, C. and Tamboukou, M. (2013) *Doing narrative research* (2nd edition). London: SAGE Publications Ltd.

American Psychiatric Association (2013) *Diagnostic and statistical manual of mental disorders* (5th ed., Text Revision).

Benenzon, R.O. (1981) *Music therapy manual*. C.C. Thomas, pp. 1–158.

Bhat, A.N. (2020) 'Is motor impairment in autism spectrum disorder distinct from developmental coordination disorder? A report from the SPARK Study', *Physical Therapy*, 100(4), pp. 633–644.

Brule, E., Bailly, G., Brock, A., Valentin, F., Denis, G. and Jouffrais, C. (2016) 'MapSense: MultiSensory interactive maps for children living with visual impairments', Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, pp. 445–457.

Capone, N.C. and McGregor, K.K. (2004) 'Gesture development: A review for clinical and research practices', *Journal of Speech, Language, and Hearing Research*, 47, pp. 173–186.

de Marchena, A., Kim, E.S., Bagdasarov, A., Parish-Morris, J., Maddox, B.B., Brodkin, E.S. and Schultz, R.T. (2019) 'Atypicalities of gesture form and function in autistic adults', *Journal of Autism and Developmental Disorders*, 49(4), pp. 1438–1454.

Godøy R.I. and Leman, M.(2010) *Musical gestures: Sound, movement and meaning*. Routledge.

Green, D., Charman, T., Pickles, A., Chandler, S., Loucas, T., Simonoff, E., et al. (2009) 'Impairment in movement skills of children with autistic spectrum disorders', *Developmental Medicine and Child Neurology*, 51(4), pp. 311–316.

Heaton, P. (2003) 'Pitch memory, labelling and disembedding in autism', *J Child Psychol Psychiatry*, 2003(44), pp. 543–551.

Hook, J., Verbaan, S., Durrant, A., Olivier, P. and Wright, P. (2014) 'A study of the challenges related to DIY assistive technology in the context of children with disabilities', Proceedings of the 2014 Conference on Designing Interactive Systems, pp. 597–606.

Hunt, L., Eagle, L. and Kitchen, P. (2004) 'Balancing marketing education and information technology: Matching needs or needing a better match?' *Journal of Marketing Education – Journal of Market Education*, 26, pp. 75–88.

Hurt-Thaut, C. (2009) 'Clinical practice in music therapy', in S. Hallam, I. Cross and M. Thaut (eds.) *The Oxford handbook of music psychology*. Oxford University Press, pp. 503–514.

Leman, M. (2008) *Embodied music cognition and mediation technology*. MIT Press.

Magee, W.L. (2006) 'Electronic technologies in clinical music therapy: A survey of practice and attitudes', *Technology and Disability*, 18(3), pp. 139–146.

McCarthy, J. and Wright, P. (2015) *Taking [a]part: The politics and aesthetics of participation in experience-centered design*. Cambridge, Massachusetts: The MIT Press.

Mol, A., Moser, I. and Pols, J. (2010) 'Care in practice: On tinkering in clinics, homes and farms', *Care in Practice*, 8.

Mortari, L. (2015) 'Reflectivity in research practice: An overview of different perspectives', *International Journal of Qualitative Methods*. 10.1177/1609406915618045.

Nagler, J. (1998) 'Digital music technology in music therapy practice', in C. Tomaino (ed.) *Clinical applications of music in neurologic rehabilitation*, pp. 41–49.

Paul, S. and Ramsey, D. (1998) 'The effects of electronic music-making as a therapeutic activity for improving upper extremity active range of motion', *Occupational Therapy International*, 5, pp. 223–237.

Quintin, E.-M. (2019) 'Music-evoked reward and emotion: Relative strengths and response to intervention of people with ASD', *Frontiers in Neural Circuits*, 13, p. 49. 10.3389/fncir.2019.00049.

Ragone, G., Good, J. and Howland, K.L. (2020) OSMoSIS | Proceedings of the 2020 ACM Interaction Design and Children Conference: Extended Abstracts. IDC '20: Proceedings of the 2020 ACM Interaction Design and Children Conference. https://doi-org.ezproxy.sussex.ac.uk/10.1145/3397617.3397838.

Ragone, G., Good, J. and Howland, K. (2021) 'How technology applied to music therapy and sound-based activities addresses motor and social skills in autistic children', *Multimodal Technologies and Interaction*, 5(3), p. 11.

Roth, W.-M. (2005) *Auto/biography and auto/ethnography: praxis of research method*. Rotterdam: Sense.

Sacks, O. (2008) *Musicophilia: Tales of music and the brain*. Vintage Books.

Schauder, K.B., Mash, L.E., Bryant, L.K. and Cascio, C.J. (2015) 'Interoceptive ability and body awareness in autism spectrum disorder', *Journal of Experimental Child Psychology*, 131, pp. 193–200.

Schön, D. (1983) *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Stefani, G. and Guerra-Lisi, S. (2006) 'Globalità dei Linguaggi', Manuale di MusicArTerapia, Carocci, Roma.
Srinivasan, S.M. and Bhat, A.N. (2013) 'A review of "music and movement" therapies for children with autism: Embodied interventions for multisystem development', *Frontiers in Integrative Neuroscience*, 2013(7), p. 22.
Torres, E.B. and Donnellan, A.M. (2015) 'Editorial for research topic "Autism: The movement perspective"', *Frontiers in Integrative Neuroscience*, 9, p. 12.
Wilson, R.B., McCracken, J.T., Rinehart, N.J. and Jeste, S.S. (2018) 'What's missing in autism spectrum disorder motor assessments?', *Journal of Neurodevelopmental Disorders*, 10.