The role of using technology within music therapy sessions with pre-school children who have physical disabilities at a conductive education centre in New Zealand.

A thesis presented to fulfill the requirements for the degree of

Master

of

Music Therapy

at Victoria University, Wellington,

New Zealand.

Yutong Gao

2018

Abstract

The objective of this research was to explore the role of technologies within music therapy sessions for children who have physical disabilities. This research used secondary analysis of clinical data to find the role of technology within my clinical practice. Data included clinical notes, and my own reflective journal from February to September in 2018. I used thematic analysis to uncover themes from my data.

Five themes were found that indicate that technology can positively contribute to music therapy sessions. In particular, the research has identified that technologies can be used to support cognitive development, communication efforts, emotional reactions, motor skills, and sensory stimulation for children. The research will contribute to current debates around the role of technology in music therapy sessions to further support children with physical disabilities.

Acknowledgement and Ethical Declaration

I gratefully acknowledge the many people who have helped me complete this research:

Dr. Daphne Rickson, Senior Lecturer of Music therapy, my supervisor, for your guidance, support, encouragement, and patience;

Dr. Sarah Hoskyns, my teacher, for teaching and supporting my study for the past two years;

Fiona Hearn, my visiting music therapists, her help, inspiration and kind support for my clinical practice this year;

Andor Cseh, Danielle Simnor, Kathy Blake, Robyn Laird and Tarika Naidu, their support and encouragement;

Carolyn Ayson, my second supervisor, for her inspiration, encouragement, and suggestions for my research in the first half of this year;

Dr. Xiaodan Gao, the Manager of Student Learning at Victoria University of Wellington, her encouragement and for proofreading for my thesis;

I would also like to thank all the students and their families who attended to my music therapy sessions, for their trust.

This research project was given Ethical Approval by the Victoria University of Wellington's Human Ethics Committee with the New Zealand School of Music (NZSM) of Music Therapy Programme for students' research in NZSM 526. Approval # 22131

Table of Contents

Introduction

Research Context

I have been working at a conductive education centre (CEC) for nine months this year. The CEC is licensed and chartered as an Early Childhood Centre (ECE) for Conductive Education Programmes for children with motor disorders under 5 years old. The partnership between CEC and Early ECE is based on the principles of both Conductive Education and Te Whāriki (New Zealand's Early Childhood Curriculum). Te Whāriki is defined as 'a vision for children who are competent and confident learners and communicators, healthy in mind, body and spirit, secure in their sense of belonging and in the knowledge that they make a value contribution to society' (Education, 2019).

In New Zealand, the Needs Assessment and Service Coordination (NASC) service can work out the way to support to children with disabilities or children who are not developing as expected. NASC will looks at children's abilities, resources, objectives, and needs. Moreover, the service gathers a specialized support staff to best suit children with special needs (Ministry of Health, 2018).

The main focus area at CEC is to coordinate physical, cognitive, and emotional factors in children's learning, using comprehensive activities with the assistance of all staff members. Staff provide specific and professional programmes and activities to help children achieve different levels of learning and development at CEC. Staff at CEC includes qualified Conductors, Early Childhood Teachers, and Education Support Staff. In addition, family involvement is a crucial feature for children's learning at CEC.

Approximately 15 children attend the CEC each week. Most of the children in CEC have a Cerebral Palsy diagnosis, and many have significant physical

disability. I worked each week from Monday to Wednesday primarily with children, and I worked with teenagers who are diagnosed with Autism and physical disabilities in the after-school programme on Mondays and Tuesdays. I delivered individual music therapy sessions everyday to different children and offered group music therapy sessions each Monday and Wednesday.

The CEC has a kitchen, a bathroom, a special bathroom for children, an office room, an entrance, one music room, a sensory room and two main activity rooms. Moreover, there are many kinds of walking and standing frames for children to use. The music room has a piano, keyboard, ukulele, two guitars and tuned and un-tuned percussions instruments.

Music Therapy Approach

Various technologies used by others in music therapy sessions have provided us with ideas for exploring the effect of using different technologies in helping children with physical disabilities. Music technologies are a resource for music therapists to help clients meet their goals (AMTA, 2013).

I have developed a client-centered humanistic music therapy approach which incorporates the theories of development in early childhood outlined by music therapist Elizabeth Schwartz (2008). Schwartz stated that the main facets of a young child's life include 'physical, cognitive, emotional, social and sensory growth: getting physically bigger and stronger, learning to move and crawl and walk; learning to think, and to use language and to relate to other people; the understanding of feeling, giving meaning to actions; and being able to think about the self as self' (Schwartz, 2008, p11). My research findings highlighted the importance of technology in supporting children's cognitive development, communication skills, emotional reaction, motor skills and sensory stimulation.

Motivation

When I began working at CEC, I noticed the sensory room with electronic technologies and other devices, such as computers and tablets and a small space with a resonance board. Moreover, I found that the staff at CEC use technologies with children quite often. For example, staff often took the children into the sensory room to provide them sensory stimulation. In addition, my liaison also encouraged me to use any of the available equipment within my music therapy sessions. By observing the positive benefits yield by the technologies I was impressed and motivated to explore the role of using technology within music therapy sessions with children who have physical disabilities.

Research Question

The research question for the current study is 'what is the role of technologies within my music therapy sessions with children who have physical disabilities at a conductive education centre?'

Aim of the Research

This exegesis describes the role of using technology within my music therapy sessions with children who have physical disabilities at a conductive education centre. Music therapy is thought to be beneficial, in supporting children with severe physical disabilities (Oldfield, 2010). One area that researchers have focused on in recent years is the role of technology in music therapy sessions. This research is aimed to explore how technology supported me in my role as a music therapy student to help clients to meet their goals.

Technology

Recently, researchers have shown an increased interest in using technology within music therapy sessions. Surveys such as that conducted by Knight and

LaGasse (2012) have shown that it is important for music therapists to consider whether using technology further supports therapeutic aims in music therapy sessions. They found that people with physical disabilities could benefit from the implementation of different kinds of technologies in sessions to enhance communication skills, emotional expression, social and cognitive development, relaxation to minimize pain and to build identity and self-esteem.

It is necessary here to clarify exactly what is meant by 'technology' in this paper. For the purpose of this research I have defined it as 'any electronic devices (such as a computer, portable tablet, and activated switch) or adapted equipment (such as Velcro Fasteners for beaters, resonance boards and specially designed instruments such as a Foil-Drum with a Makey Makey*)'. I provide some examples in the following paragraphs.

BIGmack

BIGmack (BIGmack, 2018) is a simple communication device that is relatively easy to use. The most visible component is a big red button. However, a support person can record speech, music or any other sounds into the device, and children are able to reproduce the recording by pushing the button. In music therapy, for example, it is possible to record a phrase of a song, and for children to 'play' the phrase again by pushing the button.

Picture 1, BIGmack.

Board Makers

A board maker (Johnson, 2018) is a convenient communication tool that is easy to make. The teacher and therapists can create different symbols or pictures to suit their participants based on the disabilities. For example, I downloaded images that are related to particular objects, laminated them, then cut and divided them separately. These images were used as symbols for instruments and songs.

Picture 2, board makers.

Portable Tablets

Portable tablets, such as an iPad is another technology I have been using in my clinical practice. With it, I was able to play videos through YouTube and use downloaded apps, such as ACC, Drummer, Keezy, and Drum Buddy. ACC contains several blank pictures on one screen, which I could take different pictures for each blank and type the word about the specific object. It can include 1 to 12 pictures in one screen. I used it to provide options for children within music therapy sessions. Drummer contains 12 different percussion sounds, such snapping, blipping, clicking, and shaking. I used it to set different sounds and provide hearing stimulation for children. Keezy includes 8 colored tiles in one screen, which I can record a sounds into each one. After recording it, children can tap the tile to hear the sounds. I am able to set different time signature and speed through Drum Buddy. Children can hear the sounds after pressing the screen. Moreover, I usually play a real drum once children start the sounds.

Makey Makey

A Makey Makey is an electronic kit for children or adults to use to, by connecting objects with computer keys. Each Makey Makey has a main board, seven alligator cables, six white wires and a USB cord. A Makey Makey is easy to operate. I connected the main board with my laptop through the alligator cables, the white wires, and the USB cord.

For my practice work, I made a 'foil guitar' and a 'foil drum' for students when using a Makey Makey. I used black paper and cut it into a drum shape, and stuck three little squares to the edge of the drum. Then I stuck tinfoil on each of the squares. I used the official website of Makey Makey - Bongos when using the 'foil drum' in my music therapy sessions during my placement. The laptop can make sounds when children tap on the surface of the foil drum.

Picture 3, MakeyMakey.

Resonance Boards

A resonance board (Hurst, 2018) is a piece of useful equipment for children or students who have visual or hearing impairment. It is lightweight, easy to move and clean. Generally, the sizes for a resonance board are 4'x 4', 4'x 6', and 4'x 8'.

A resonance board can reinforce auditory, tactile and kinesthetic input, providing stimulation for children each time they move and when other movements happen around them. In my placement, we usually laid a child on the resonance board with some instruments around them, such as a drum, xylophone, guitar or ukulele.

Picture 4, resonance board (BBs Boards).

Sensory Rooms

A sensory room (Sensory Room, 2018) is a specially designed room, which focuses on providing multiple stimulations for students or children who have different abilities. In the CEC, the sensory room has a black wall with several flashing lights, a lightening ball, a radio and a control panel that is able to set up the duration of the session after turning on other objects. Additionally, there is a

blue button that connects with the control panel, which enables other objects to be turned on.

The sensory room in CEC has a radio, which connects with the control panel. The radio is able to provide aural sensation to the children once they press the blue button.
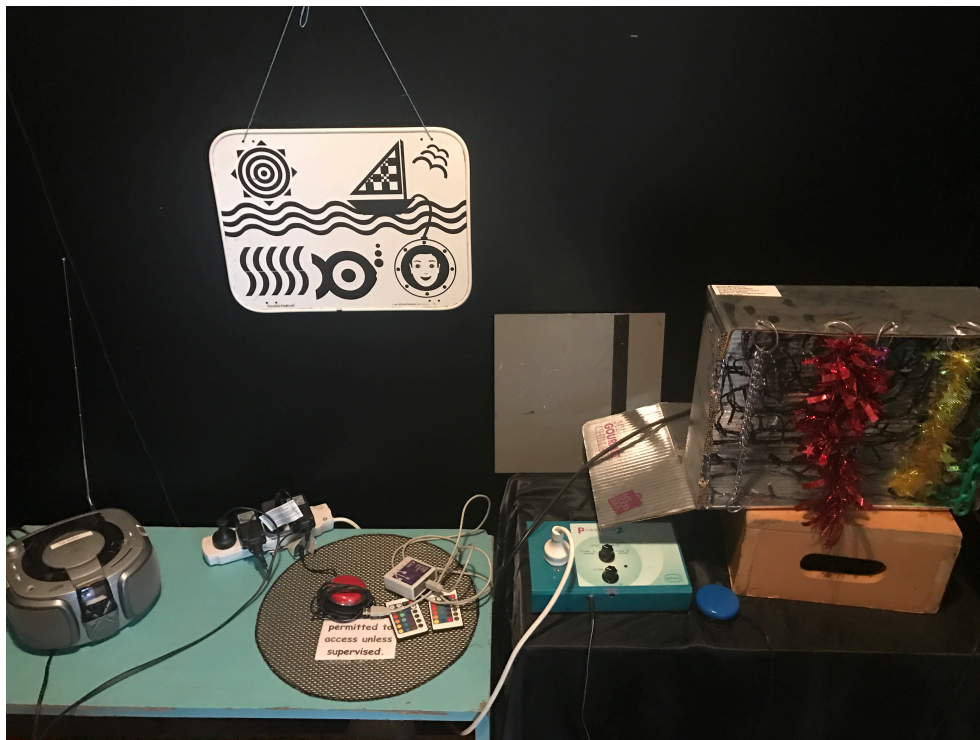
Picture 5, technologies in sensory room.

Velcro Fasteners

A Velcro Fastener (Speedtech) is a self-engaging tool that is made with a hook and loop. The Velcro Fastener can stick to objects easily, which are able to wrap around students or children's wrist. In my clinical practice, I used Velcro Fasteners with un-tuned percussion. In music therapy, for example, it is possible to let the participants hold the instruments steady and longer.

Picture 6, instruments with Velcro Fasteners.

Thesis Structure

This thesis is divided into six chapters. The first part gives a brief overview of the literature, which describes the use of technology and music therapy. The second chapter is concerned with the research methodology used for this study. Chapter three begins by laying out the theoretical framework of the research. The fourth chapter presents the findings of the research, which focuses on the five key themes that relate to the role of using technology. Finally, a discussion and conclusion are offered.

Literature Review

General

The literature has highlighted that technology within music therapy sessions includes a range of different items, and that it plays a large role in music therapy programmes to increase music making and help clients meet their goals. One of the main pieces of research on technology within music therapy sessions was

present by Crowe and Rio (2004). In their research, they presented various technologies being used in different scenarios. They also reported the structure of using technologies in music therapy contexts: accompanying with acoustic instruments, recording technologies, technologies for people with disabilities, electronic music instruments, computer applications, medical technologies and technology-based healing practices. Over the past decades, technology has become 'increasingly sophisticated' (Burland & Magee, 2014, p 327) and different kinds of electronic technologies have been used within music therapy sessions. It is now well established from a variety of studies that technology plays a crucial role within music therapy sessions (Clements-Cortès, 2014, Knight & LaGasse, 2012, Crowe & Rio, 2004).

The research from Crowe & Rio (2004) also mentioned the technology applications in music therapy can be classified according to seven different categories: adapted musical instruments, recording technology, electric/electronic musical instrument, computer applications, medical technology, assistive technology for the disabled, and technology-based music/sound healing practices (p.282). Moreover, Clements-Cortès (2013) stated that technology is beginning to take a large role all through the life span within music therapy, as there were more applications related to music, music education, and music therapy. They also listed some categories, such as computer-assisted devices, software applications, and music video games being used in music therapy. The survey from Hahna et al (2012) also showed that there were large proportion of music therapists using technology in music therapy sessions. Furthermore, in an analysis survey Cevasco & Hong (2011) pointed out that a number of music therapists and music therapy students and interns are using technology in variety ways throughout their clinical music therapy sessions.

History

Vega & Keith (2012), citing Fitzwilliam, (1988) and Krout (1989) stated that many music therapists have mentioned using technologies within their own practice over several decades.

Knight and LaGasse (2012), showed that from a historical perspective, the technology in music therapy has been focused on hardware, such as adaptive switches (Magee et al, 2011) and computer devices (Krout & Mason, 1988). Hahna et.al., (2012) showed that the benefits of the increasing use of technology within music therapy sessions based on previous literature. Moreover, their findings, based on a survey with music therapist participants from Australia, Canada, the United Kingdom, and the United States, showed that there were an increasing number of music therapists using technology in their clinical practice.

Electronic music technologies (EMTs) have become increasingly used by both music therapists and clients in the past 15 years within music therapy practice (Clark, et al, 2011). Music technologies are a resource for music therapists to help clients meet their goals (AMTA, 2013). Using technology in music therapy sessions could facilitate 'communication skills, self-expression, environment awareness and interaction, physical rehabilitation, social interaction and group behavior, speech and language acquisition, self-awareness, and self-esteem, sensory use and response, and emotional awareness and expression' (Crowe & Rio, 2004, p.288). People with physical disabilities could benefit from these kinds of technologies to enhance communication skills, emotion expression, social and cognitive development, relaxation, minimizing pain and building identity and self-esteem (Knight & LaGasse, 2012; Smith, 2012; Clement-Cortès, 2013).

Definition

'Technology' in music therapy has been defined by other researchers. 'In fact, in music therapy, it [technology] may involve any equipment, device, or method that systematically fosters the production of or response to music' (Crowe & Rio, 2004, p.283). According to the researchers, using technology in music therapy sessions could be defined as a process of a 'low-tech-high tech continuum' (Crowe & Rio, 2004; Knight & LaGasse, 2012). Low technology refers to devices that are easy to learn and use, whereas high technology may need more take time to learn.

In this research, I have chosen to refer to 'any electronic devices (such as a computer, portable tablet, and activated switches) or adapted equipment (such as Velcro Fasteners for beaters, resonance boards and specially designed instruments such as a Foil-Drum with Makey Makey*)' as 'technology'.

Meeting Goals

Using technology in music therapy sessions could help the music therapist reach their goals effectively. Magee (2006) and Knight and LaGasse (2012) stated that using technology within the music therapy sessions helped the music therapist to meet their goals (Crowe & Rio, 2004; Krout, Baker, & Muhlberger, 2010), and helped clients meet their own needs, by engaging them into music scenarios. They also pointed out that technology was able to allow participants to control their own music well. Some researches mentioned that using technology within music therapy sessions enables people to access music making and help the participants achieve their own needs (Cevasco & Hong, 2011; Knight, 2013; Clements-Cortès, 2014; Sussman, 2014; Engelbrecht & Shoemark, 2015).

Technology and Physical Disabilities

Electronic music technologies seem to be effective in helping people with physical disabilities. Music therapists can use technology in both individual and group sessions with people who have different abilities and in all age groups.

Another analysis and discussion on the subject was presented by Clements-Cortès (2013). She stated that technology has played a crucial role in the field of music therapy where EMTs are used with children, adolescents and elderly. Moreover, music technologies can be used with clients with developmental, physical or other complex disabilities. It may become easier for clients to improvise when using technologies in music therapy sessions. Researches from Clements-Cortès (2013), Knight & LaGasse (2012) and Magee & Burland (2008) stated that technologies may help participants with physical disabilities express their emotions easier.

People with physical disabilities could benefit from using these kinds of technologies to enhance communication skills, social and cognitive development, relaxation, minimizing pain and building identity and self-esteem (Knight & LaGasse, 2012). In addition, according to Clements-Cortès (2013), using technology in music therapy sessions could create opportunities for physical, cognitive and social development, and allow individuals to access music effectively. She also pointed out that technologies in music therapy sessions are an 'excellent motivator' to meet specific needs, and could help clients with physical disabilities, particularly children and adolescents, to participate well in music therapy sessions.

Different Types of Technology

A variety of different technologies could be used in the music therapy session. Knight & LaGasse (2012) researched with different types of technology within

music therapy based on the history of technology in music therapy sessions. They also stated that there are several different types of technologies that can be used in music therapy sessions, including computer-assisted devices, specialized input and switch activated devices, recording technology, music software applications and music video games (Smith, 2012; Clements-Cortès, 2013). Furthermore, Hahna et al., (2012) stated that music therapist participants in their research reported that they choose different types of music technologies within their clinical work, such as Soundbeam, MIDI creator, Software with specialist input devices, Electronic hardware and software, Electronic MIDI instruments, Amplification equipment, Recording technologies, and Vibroacoustic therapy equipment.

The following sections explain a few of the key technologies used in music therapy.

Computer Devices

Computer assisted devices are one of the main technologies used in music therapy sessions. Vega & Keith (2012, as cited in Gregory, 1987) suggested that using computers in music therapy sessions enabled therapists to create therapeutic goals with clients.

Clements-Cortès (2013) pointed out that using computers in music therapy sessions for children with physical disability is a good way to help them develop motor and music skills, and enjoy the music when they are not able to play instruments. Furthermore, using software could facilitate children with disabilities to access music (Correa, Ficheman, Nascimento and Deus Lopes, 2009; Clements-Cortès, 2013). Moreover, Kraut and Mason (1988, as cited in Knight & LaGasse, 2012) suggested that using computing technology creates

'motivational aspects' in music therapy sessions with children with behavior disabilities. In addition, Nagler and Lee (1987, as cited in Knight & LaGasse, 2012) stated that computing provides an opportunity for the client to make choices and sounds.

In addition, Bates (2014) discussed the benefits and detractions for using computer-mediated music therapy (CMMT). CMMT is non face-to face meeting between music therapists and client, with online technology enabling interaction. One of the benefits of CMMT is that travel is not necessary, which in turn enables participants to be more flexible in terms of meeting times (Rummell and Joyce, (2010). However, the efficacy of taking CMMT needed to be considered. A study from Krout et al. (2010) and Baker & Krout (2009) established that it may limit the interaction and create challenges of music making between music therapists and clients.

Portable Tablets

Previous studies have assessed the efficacy of using an iPad within music therapy sessions. Knight (2013) identified that portable tablets, such as an iPad, provided an effective bridge for the music therapist and their participants to experience various instruments.

A previous study from Knight & LaGasse (2012) stated that using different apps on iPads would be able to encourage clients' fine motor skills. They also pointed out that participants were able to discover the different sounds of instruments by their slight touch on the apps. They gave the examples that Garageband (App) can be used to support participants' fine motor skills, and apps such as Onsong could be used as music storage for music therapists to help participants access their preference quickly. Furthermore, in their research, they

suggested some apps are able to help clients play "stringed instruments" when touching the screen for different sounds of instruments. (p. 194)

Engelbrecht & Shoemark (2015) suggested that portable technology could play an important role in helping people access the music they preferred (Knight, 2013). They also stated that iPad can provide more choices for music making (Creech, Hallam, McQueen, & Varvargou, 2013; Knight, 2013). Moreover, Clements-Cortès (2014) also recommended that apps were able to help participants provide music making and create improvisation within music therapy sessions.

Using different apps on tablets could help participants express their emotions and to create of compositions and improvisations (Clements-Cortès, 2013; Knight & LaGasse, 2012). In addition, Knight & LaGasse (2012) suggested that using tablets may enable participants to create more electronic sounds and could help the music therapist provide more options for the participants in the music therapy session (Knight, 2013), thus leading to increased positive outcomes.

More importantly, according to Crowe and Rio (2004, as cited in Knight, 2013), the apps on the iPad may help provide a unique musical experience for clients, as well as providing a high quality musical experience.

Switch-Activated Devices

A recent study by Knight and LaGasse (2012) found that most music therapists choose a switch with simple push button for their participants within music therapy sessions. They also stated that switches were able to help clients to express their needs by pressing the button. The client could press the button to turn on or off music or other objects, to turn on a recorded music phrase.

As noted by Clement-Cortès (2013), switch devices with recorded phrases were able to help participants with physical disabilities access to music activities and enabled emotional expression. Using different apps on tablets could help participants express their emotions, and create improvisation (Clements-Cortès, 2013; Knight & LaGasse, 2012). In addition, Knight and LaGasse (2012) suggested that using tablets to create more electronic sounds by the participants which improve their positive outcomes in the music therapy session (Knight, 2013).

Music Videos

Using music video games can be an effective and motivating way for children to increase their focus, patience, socialization and controlled behavior.

One study by Whitehead-Pleux, Clark, & Spall, (2011) involving music video games, found they were able to encourage participants' motor skills and eye coordination (Clements-Cortès, 2013). Smith (2012, as cited in Retiman, 1990) suggested that music videos are a 'cool factor' within music therapy sessions.

Potential Barriers and Detractions of Using Music Technology

There are several reasons why some music therapists do not use technology in their music therapy sessions. A survey of music therapists in the UK by Magee (2006), showed that 30% of respondents stated using technology is irrelevant for their clinical work. Knight and LaGasse (2012) pointed out that some music therapists may not realize that using technology in music sessions has an effective impact on their clients.

In addition, Clements-Cortès (2013) gave four reasons to not use technology.

Firstly, acoustic instruments might be more suitable in some scenarios and using the technology may not be appropriate. Secondly, technology may make the participants confused. Thirdly, when using the technology, the music therapists may have less control of the music session. Moreover, some music therapists believe that technologies prevent the communication between them and the clients.

Furthermore, in an investigation with professional, interns and students in music therapy, Cevasco and Hong (2011) reported that some technologies were not accessible or affordable. Moreover, their survey results suggested that even when music therapy students were able to access to technology, they did not necessarily know how to utilize it in their clinical settings.

In a follow up study, Hahna, Hadley, Miller and Bonaventura (2012) stated that in some cases, the therapists probably lack technological knowledge, are afraid or not keen on technology, have no time to learn how to use technology, think that technology is unreliable, and they think using that technology has budget limitations

Summary of literature review

According to Knight and LaGasse (2012), the aim of using technology is to engage the client in music, whether by using electronic devices or acoustic instruments. When using technology within music therapy sessions, the key consideration is about whether the technologies are effective, it is not about what kind of technology the therapist uses. From the review of the literature it appears that the role of technology within music therapy is growing and better understood. However, the number of studies on the role of technology is still limited, and the roles are still debated and not always tried because of lack of experience. As noted above, there were benefits and challenges mentioned in the

literature.

Therefore, I wish to further explore how technology can be used within my music therapy sessions and what effects they may have.

Methodology

Music Therapy Approach

Music technologies are a resource for music therapists to help clients meet their goals (AMTA, 2013). My practice drew on client centered, and resource-oriented approaches. According to Rolvsjord (2010) the resource-oriented concept of music therapy practice provides opportunities 'not only to explore problems, trauma and difficult emotions, but also to explore strengths, joy and mastery, and to try out ways of using music as a resource in everyday life' (p.7). My music therapy approach values the use of technology as a way to support children's development.

Schwartz (2008) stated that the main facets of a young child's life include 'physical, cognitive, emotional, social and sensory growth: getting physically bigger and stronger, learning to move and crawl and walk; learning to think, and to use language and to relate to other people; the understanding of feeling, giving meaning to actions; and being able to think about the self as self' (Schwartz, 2008, p11). My clinical music therapy practice at a conductive education centre aimed to support children's cognitive development, communication skills, emotional, motor skills and sensory growth using technology, as appropriate, within my music therapy sessions.

Research Methodology

I used a research methodology called secondary analysis of qualitative data to explore the role of using technology within music therapy sessions with children who have physical disabilities at a conductive education centre in New Zealand. Secondary analysis of data involves the use of pre-existing data, data collected for another purpose, as research data (Heaton, 2004). Magee and Davidson (2004) stated that secondary data sources can include the therapists 'observation of clients' musical, verbal and behavioral reactions within the music therapy sessions, and therapists 'clinical notes'. The secondary data for my research consists of my clinical notes, session plans, and self-reflections recorded in my therapy journal. My clinical notes included observation of children's behavior and reactions, emotional changes, and body movements in individual and group music therapy sessions. I wrote my reflection notes weekly and my reflection focuses mainly on childrens' changes, my challenges through clinical practice, my new thoughts, and general observations.

Qualitative/Interpretive Research

This study's theoretical orientation is interpretivism. Interpretivist research is 'an iterative process that begins with a general curiosity about a phenomenon or personal experience' (Darrow, 2016). In interpretivist research process, the research topic normally comes from the researcher's experience or realization the 'deficiency in the literature' (Creswell, 2007, p 42). Further more, Bruscia (2005) stated that in interpretivist research, researchers use their own understanding of the phenomenon, connected with given theories to interpret their data.

This research involved secondary analysis of qualitative data to uncover the role of technology within my music therapy sessions. Denzin and Lincoln (2000)

stated qualitative research is 'many things at the same time' (p.7). They also defined that qualitative research as an 'interdisciplinary, transdisciplinary, and sometimes counterdisciplinary field'. In the second edition of *Music Therapy Research, Definition and Characteristics,* Bruscia (2005) described qualitative research as 'a process wherein one human being genuinely attempts to understand something about another human being or about the conditions of being human by using approaches which take full advantage of being human' (p.63).

Research Method

The data was collected from the conductive education centre where I worked three days per week for nine months, conducting individual and group sessions. The research analysis and write up was conducted from July to October 2018. I reviewed my clinical notes to investigate and understand my research question deeply, 'what is the role of using technology within music therapy sessions with children who have physical disabilities' in my clinical practice. The method of data analysis for my research was thematic analysis.

Data sources

There are two main data sources I used for my research.

1. Clinical notes

I wrote clinical notes after each individual and group session each day at my placement. I typed my notes into my own laptop and did not share them with other people to protect the children's privacy.

2. Reflection journal

I wrote my overall observations, feedback, new knowledge and questions each week. Moreover, I put notes from my clinical visiting music therapist's

suggestions and advice into my reflected journal as well.

Participants

Informed consent was obtained for me to use data relating to nine children. The children were diagnosed with cerebral palsy, lissencephaly, Rett Syndrome, Down Syndrome, and congenital muscle issues in the centre. All of these nine children are under five and come to the centre regularly each week.

Data analysis

I examined my data using a thematic analysis approach. According to Clarke & Braun (2016), 'thematic analysis (TA) is a method for identifying, analysing, and interpreting patterns of meaning within qualitative data' (p.297) and drawing out themes (Clarke & Braun, 2016).

Data analysis process

The data for this research included my clinical notes and reflected journal from February to September in 2018. I looked back at my notes at the end of July when I started the data analysis for the research. I reviewed all my notes firstly to become familiar with my data and kept reading my notes through my data analysis process.

Raw Data

I collected my clinical notes from February to September 2018, which related to using technology within music therapy sessions. I did not use technologies in

each music therapy session. I decided whether to use technologies based on the main goals or focus area for children who attended music therapy sessions.

Initial Coding

At this step, I highlighted the technology I used and any sentences or information that was important in my notes, which related to my research question: 'what is the role of technology within music therapy sessions'. Moreover, I coded the technology I used and the role of that technology in single words or phrases for each session. For example, I noted 'I used ACC for the child, in order to help them choose instruments'. I highlighted ACC and chose significant words. After that I wrote 'ACC' as the technology I used and 'making choices' as the role for that specific music therapy session.

Creating Categories

Based on the previous step, I first sorted all the codes in alphabetical order, which helped me to find similar roles. Meanwhile, I added interpretation after each session to explain the reason I defined the specific role for the particular session. For example, I coded 'attention' for a particular session, and I interpreted 'the technology provided the children with sensory stimulation, which helped them to stay alert. Then they were more able to attend to the shining lights'. When I interpreted my notes, I kept asking myself 'what technology did I choose, and what was the role of that particular technology'.

In addition, I deleted the sentences of my notes that were not relevant, which helped me catch the main words and key points when analyzing at the final step.

Developing categories

At the final step within excel, I created a coloured diagram for each role in my document, then I expanded my explanation for each role. I found 11 different roles throughout my clinical practice for using technology. They included attracting attention, learning cause and effect, supporting communication, eliciting emotional reactions, making choices, encouraging motor skills and giving auditory, tactile, kinesthetic, and visual sensory stimulation.

Defining Themes

I defined different themes following the theories of development in early childhood by Elizabeth Schwartz (2008), which included 'physical, cognitive, emotional, social and sensory growth (p11). I identified five themes, which were 'cognitive development (attracting attention, learning cause and effect, and making choices)', 'communication efforts', 'emotional reaction', 'motor skills (gross and fine motor)', and 'sensory stimulation (auditory, vibration, and visual)'.

Example of data analysis have been provide in Appendix 3.

Ethical Considerations

This research is covered under the ethical approval gained from the University Ethics Committee for the programme. This study followed the Victoria University of Wellington Human Ethics Policy, issued by the Human Ethics Committee of Victoria University of Wellington, with respect to the Treaty of Waitangi and adheres to the Code of Ethics for the practice of music therapy in New Zealand. Informed consent was obtained in writing from the families, and assent was gained from the children, implicated in this research. All the information was

treated as confidential, and real names have not been be used. Informed consent was collected before starting the project. The forms used are in Appendix 1 & 2.

Findings

The findings explain the role of using technology throughout my clinical practice. The findings are group into five themes to promote cognitive development, support communication efforts, promote self-expression skills, support motor skills, and provide sensory stimulation. And the themes showed that the roles can be beneficial, but benefits are mediated by how and when technology it is introduced.

Cognitive Development

The predominant category that emerged with regard to the role of technology within music therapy sessions was that technology can promote children's 'cognitive' development. Using technology within music therapy sessions with children who have physical disabilities, provided visual stimulation, which seemed to promote various cognitive responses such as 'capturing attention', 'learning about cause and effect' and 'making choices'.

Capturing Children's Attention

Using technology with children who have physical disabilities I was able to catch children's attention with sensory stimulation. The sensory room included a black wall, a radio and lights, which provided visual and auditory stimulation for children. For example, in a particular session, I observed that a child's eyes were attracted by the lights and the child moved their head to see the radio. Portable tablets, such as an iPad, gave children access to different sounds and visual images. In my observation, children became more curious when noticing the

tablet. However, they needed time to get used to the iPad (as in the music therapy session when the child was attracted by the iPad by a second time). My clinical notes below further explain the preparation needed when using iPads.

I showed the song on the ipad, then played the hello song. But they did not watch carefully and moved their head a lot. The iPad did not attract their attention – I moved the iPad away. After we sang several songs and played some instruments, like the xylophone, chime, drum, they smiled a lot, especially with the chime. Then I took the ipad to them again, and played the same song. This time, they kept their eyes on the screen much more carefully than the first time.

Clinical notes 4ᵗʰ April

I used the same video during this music therapy session and the child's attention was attracted by the tablet at the second time. I observed this by the child's facial expression, such as smiling; body movements, clapping hands and head movement.

In addition, technology such as the resonance board enabled the students to experience stronger sounds and vibrations. In my clinical practice, I have observed that the children gave more responses when I played instruments on the resonance board while they laid on it, rather than playing the instruments in front of them. In the music therapy session, for example, I put a ukulele and a drum on the resonance board when a child laid on it. After I played the instruments near them, the child moved their head and looked at the instruments quite often. However, the child responded less when I played instruments in front of them without the resonance board.

However, in my clinical practice I have also noticed at times that acoustic instruments attract children's attention better than using other technologies. For example, when using the technology in the sensory room, the lights and radio

normally start at the same time. However, in some particular sessions, I used a ukulele or guitar to replace the radio when the lights turned on. Children seemed to be attracted more by the ukulele or guitar than the flashing lights. (See the notes below)

For example:

> *After ten minutes, they started to reach the button, it seems that the child knows that the button could start the music. I held the Ukulele and played when they pressed the button - 'started' the lights. But they were only attracted by the Ukulele, not the lights. When I stopped playing, they looked at the lights slightly. However, the child did not seem to be strongly attracted by the lights. Perhaps acoustic instruments have much deeper influence than the visual stimulation for them.*

> *Clinical notes 19ᵗʰ February*

I replaced the radio with the ukulele in this particular music therapy session. I observed that the child watched the ukulele rather than the shining lights after they pressed the control button, compared to the previous session with using normal radio, children watched both the radio and shining lights.

Learning Cause and Effect

Using different technologies with children who have physical disabilities can create opportunities for them to learn about cause and effect.

Technology such as BIGmack provided students with auditory feedback, rewarding their actions to press the button for the recorded phrase. It can be particularly useful for children to be able to reproduce previously recorded greetings, such as 'hello'. In music therapy sessions, after we recorded the simple phrase into BIGmack, children were able to press the button to hear the sounds.

However, it seems some of the children needed time to get used to the technology. They took quite a long time to move their hand at the beginning of the music therapy session. For example, in a particular music therapy session, the child did not give a reaction when I provided the BIGmack the first few times. However, the child started moving their hands after repeatedly using the BIGmack several times.

Besides the BIGmack, the sensory room is another way of letting children explore cause and effect.

In the sensory room, children were able to press the button to turn on the lights and radio. After they pressed the button, the radio and lights would turn on directly. The radio and lights normally last between 10 – 60 seconds, then will turn off automatically, which facilitated children to press the button to turn them on again.

Making Choices

Using technology with children who have physical disabilities, enables them to make choices. It can provide visual and auditory stimulation, which in turn motivates and supports them to make a choice. The board maker was a helpful tool to help children make choices, it provided a clear image, which helped children see the obvious options. In my observations, I found that using a board maker was more efficient compared to not having any images when provided with the choice. (See the notes below)

For example:

I asked them which song do they want to sing when playing the drum, but they said 'I don't know'. Then I showed the board maker card I made previously

with different images with songs on it, and they chose a song from it in a short time, and sang it with loud voice.

This child's muscles are quite weak but love singing. The child usually say 'I don't know' if I asked them to choose a song or instrument without showing the image. However, I found that they made choice quickly when I showed the Board Maker to them.

In addition, ACC is another tool which has an efficient effect when helping children make choices. I spent less time setting up the app, all I needed to do was take different pictures and type the word about the specific object. In a music therapy session, for example, I used ACC to take photos of instruments, such as the guitar, xylophone, shakers, bells etc., when children chose to play instruments. Moreover, I also took photos, which represent different songs. Specifically, I used a photo with a star shaped tambourine which represents 'Twinkle Twinkle Little Star', or a bus toy which means 'the wheels on the bus'. After the child touched the screen, the loud speaker on the tablet pronounced the word which corresponded to the object. It provided children with visual and auditory stimulation at the same time. My clinical notes below further explain the value of using ACC.

For example:

When I showed the iPad ACC to them, they seemed curious and laughed, willing to touch the screen. And they chose the keyboard, and touched it more than one time. After they played the keyboard, they pointed to the ukulele, shaker, and the drum for the following three time. After a few times of playing instruments, they were totally engaged, and played the drum in such a dynamic way. Then they put the drum away, and did not touch the screen, which might mean they want to finish. Then I asked them 'shall we finish?' and they said yes.

In this particular session, ACC played an important role for children making choices. The child smiled and clapped their hands each time when I provided the instruments followed by their choice.

Communication Efforts.

The second category that emerged with regard to the role of technology was to support children's communication efforts. Using technology within music therapy sessions with children who have physical disabilities, influenced children's communication skills. It could increase and decrease their communication in different scenarios within a music therapy session.

Increasing Communication Skills

Using technology within music therapy sessions provided more opportunities for children to have verbal communication. Board Makers, such as colour cards and animal cards enabled children access to communication efforts. The visual stimulation facilitated and encouraged children to pronounce the words. Moreover, the cards provided clear images to the children, which helped me encourage them to pronounce the words from their choice. In my clinical practice, I observed that most of the children were willing to pronounce the word after they chose the object. The example below readily explains a positive change for a child.

For example:

Then I used the color card with color song I made, when I showed them the board maker color card before the song, they smiled a lot and their eyes were totally caught by the card, they seemed to look forward to the next song. They

pronounced each single word in the song. More importantly, they pronounced 'yellow' and 'red' in a very clear way, which was a great important change for them.

<div align="right">*Clinical notes 8th August*</div>

When I showed the card to the child, the child smiled and laughed with me. Throughout the song, the child pronounced each single word after I provided a pause. More importantly, the child smiled and made their own verbal sounds when I sang the 'colour song'. It was the first time the child said 'yellow' and 'red' very clearly, which was a huge improvement for them.

In addition, ACC is another efficient tool that facilitated children's verbal communication. As previously mentioned, the loud speaker on the tablet pronounced words after children pressed the screen. In my observation, children were willing to repeat the word when they heard it. In a particular music therapy session, I provided the tablet to the child after they chose to play instruments. They said 'Wow' when they saw the tablet and moved their hands to the screen. I noticed that the child repeated each word after hearing from the app.

Decreasing Communication Skills

Using technology sometimes may decrease children's verbal communication in some specific scenarios. BIGmack provided visual and auditory stimulation when working with children. However in my observation, when children pay more attention pressing the button, it might prevent their verbal communication. In some particular music therapy sessions, children had good verbal communication when singing songs and using the Board Maker. However, their verbal communication decreased when BIGmack was provided. The example below describes the specific music therapy session with a child using BIGmack.

For example:

> *Before using BIGmakc, the child had good verbal communication when singing other songs. When using the BIGmack, they pressed the button when singing 'Old Macdonald had a Farm', with recorded 'EIEIO' in BIGmack. The process was good, as they know the gap and have good hearing. But they did not give more verbal communication when using the BIGmack. They seemed to listen and waited to press the button.*
>
> *Clinical notes 3rd April*

During the music therapy session, the child did not have verbal sounds when using BIGmack. Two weeks ago, we used 'Old Macdonald had a Farm' with the Board Maker, and the child sang 'EIEIO' with their own verbal sounds nearly each time. However, in this particular session, the child only had hand movement when using BIGmack.

Promoting self-expression skills.

Another category that emerged with regard to the role of technology was the encouragement of children to express their emotional reactions. Using technology within music therapy sessions with children who have physical disabilities encourages their emotional reactions, including positive emotional reactions, such as being excited, curious and smiling. In contrast, using technology may have overstimulated some children, which could have led them to display negative emotional reactions, such as boredom, confusion and frustration.

Positive Emotion Reaction

Using technology within music therapy sessions facilitated children to show

positive emotional feedback, such being excited, curious, and the child smiling. For example, some of children smiled when they saw technologies, and some of children clapped their hands when hearing the recorded phrase from the BIGMack, and some of the children laughed noticing pictures from the ACC. The example below shows the positive emotional feedback from a child within music therapy session.

For example:

> *When I showed the iPad (ACC) to them, they seemed curious about the pictures on it. They laughed and clapped their hands, also moved their hand towards the screen, they seemed willing to choose the object. Moreover, when I gave them the instruments after they made the choice, they smiled a lot.*
>
> *Clinical note 20th February*

The technology stimulated the child's positive emotional expression. They became curious and laughed in a obvious way, such as clapping their hands, saying 'WOW', and laughing.

Negative Emotion Reaction

Using technology can also elicit negative emotional reactions from children, such as boredom, confusion, frustration and being scared.

Children might get bored when using technology within music therapy sessions. In the example below, the child gave a positive reaction before using the technology. However, the child's emotion changed when I provided BIGmack afterwards.

For example:

They said 'yellow' and 'red' very clearly, which never happened previously. However, when I used the 'Old Macdonald had a Farm' for them with BIGmack, they only gave positive responses during the first three times, including touching the button and pronouncing the word. At the fourth and fifth time, they seemed to get a little bored and their hands did not touching or move toward the button. But when singing the goodbye song, they still did well when saying 'bye' in the gap.

<div align="right">

Clinical note 8th August

</div>

In this particular music therapy session, the child has good verbal communication before using BIGmack. However, they stopped giving verbal sounds and reduced their own hand movement when BIGmack was introduced. Moreover, the child laid their head on the back of the chair and closed their eyes. In my observation with their facial expression and body movement, the child seemed to become bored by the BIGmack. However, the child still sang and filled in the gap during the 'goodbye' song as we did in previous sessions. This seemed to suggest that the technology might be the reason that led the child to become bored.

In addition, children might feel confused when technology is provided to them within music therapy sessions. From my observations, children sometimes did not react when noticing a technology. The example below explains the changes from a child.

They smiled and beat the tray when I started singing the song. After several minutes, I tried to use BIGmack, but the technology seemed to confuse them. When I showed the BIGmack to them, and there was a recorded line in it, they stopped for few seconds, and their eyes paused as well, their eyes looked like they were saying 'I am not sure about the things that showing in front of me'. I used BIGmack for giving them a chance to press the button for three times, and they still did not press and seemed to say they were 'unsure', and not involved

into it.

<div align="right">*Clinical notes 3rd April*</div>

During this music therapy session, the child's head shook a little and their eyes glinted when the BIGmack was introduced. Moreover, the child looked at me when I provided BIGmack and their hands did not reach out to press the button.

Using a Velcro Fastener for bells or shakers might make a child feel frustrated. A possible reason for that might be the tight Velcro Fastener can make children feel uncomfortable, and can sometimes make the child move the instruments away. For example, in a particular music therapy session, I used a Velcro Fastener to tie the shaker on a child's wrist. However, the child moved the Velcro Fastener away immediately.

In addition, some children seemed frustrated in some particular music therapy sessions, especially when using the Makey Makey. The Makey Makey needs to connect to a laptop, and a Foiled-Drum with alligator cables. However, the connection between the alligator cable and laptop or Foil-Drum broke during the session, which stopped the music conversation between a child and me. (See the example below)

For example:

> *I used the real bongo to match the child's beats when they used the Foil-Drum, which connected with the laptop. The technology did not work out which seems to make the child feel frustrated, and not sure what to do next. From my observation, after the MakeyMakey did not work the child still keep tapping on the surface of the Foil-Drum, and much harder, seemingly waiting for the beats come again.*

<div align="right">*Clinical notes 26th March*</div>

I observed that the child pressed harder and frequently on the Foil-Drum when the Makey Makey disconnected with my laptop. It looked like the disconnection

made the child become frustrated.

Surprisingly, one unanticipated finding was that using technology seems to scare children in some scenarios.

I have noticed that some of the children cry when I introduced some technologies to them. For example, in a particular music therapy session, I showed a video on the iPad for the children. I observed that some children shook their shoulders and heads when noticing the sounds that came from the iPad.

On another occasion, a child cried and became very upset when placed in the sensory room. It is quite a narrow space and it seemed to make them feel frightened and unwell. Even though the main lights were still turned on, the child started to cry. When I moved the child to the music room, where we normally have the music session, it took quite a long time for them to calm down. Moreover, after this experience, they seemed to remember the difficult day and it was a few weeks before they were able to stay in a narrow space again.

Motor Skill

Another category that emerged with regard to the role of using technology was to support children's motor skills. Using technology within music therapy sessions with children who have physical disabilities can encourage children's gross and fine motor skills.

Gross Motor Skills

Using technology with children who have physical disabilities provided them with various forms of stimulation, which facilitated their gross motor skills. The board maker was a good way for facilitating children's hand movement by choice

making. Within music therapy sessions, I normally encouraged children using their hands to touch or point to the picture that they wish to choose. For example, I made some Board Makers with various instruments. When I invited children to choose instruments, I showed the images to the children and encouraged them to point with their hands, which facilitated children's hand movement.

BIGmack was another efficient tool to facilitate children's gross motor skills. After recording the short phrase into BIGmack, I usually gave children a gap to move their hands to fill in the gap by pressing the button. In a particular music therapy session, I recorded 'Wind the bobbin up, Wind the bobbin up', which was the child's favorite song. After the child pressed the button, I started singing 'pull pull and clap your hands'. Then I stopped and moved the BIGmack close to the child. The child looked at me first and then turned their head to the BIGmack directly, and touched the button to hear the phrase again. As for operating a BIGmack, it only took a few seconds to record the phrase, which helped me run music therapy sessions more efficiently.

Similar findings happened in a sensory room throughout my clinical practice. The blue button, connected with the control area was able to turn on the flashing lights and the radio. I usually turned off the main lights in the sensory room, which helps children catch other flashing lights easily through the dark environment. I normally set the shining lights and radio for 20-40 seconds. In that context, children have to press the button to turn on the lights and radio, which facilitated their gross motor skills. For example, in a particular music therapy session, I set the child into a standing frame and moved the button close to the child. After the flashing light and radio turned off, I observed that the child's hand moved forward on the tray and seemed to find the control button. It took approximately five to ten seconds for the child to press the button to turn the lights and radio on again.

Using a Makey Makey with children with severe physical severe disabilities was an appropriate way to encourage them to access gross motor skills, especially for children's finger movements. For example, in a music therapy session, I used the Foil-Drum that connected to the Makey Makey. The child used their fingers to touch the Foil-Drum slightly, and then the bongo sounds came from the laptop with strong beats. Meanwhile, I used a real bongo to play and improvised with the child at the same time, which also encouraged the child to use their finger more often.

In addition, a resonance board provided strong vibrations to children, which facilitated their gross motor skills, such as head movements. The example below describes the changes for in child within the music therapy session.

For example:

> *I put them on the resonance board, and used an ocean drum and guitar to catch their attention, to help them move their head. Moreover, I put an iPad playing a video on the right side of the child (as the child normally led on the left side, and I tried to encourage them to move their head to the right side). Their head moved to the right side after I beat the ocean drum beside them with the strong video at the same time.*

> *Clinical notes 26ᵗʰ March*

The reason I used an iPad and ocean drums at the same time was to try to provide strong stimulation for the child via a resonance board. The child moved their head to the right side a few seconds after I used the iPad and ocean drums. In contrast, it took quite a long time to encourage the child's head movement when using a guitar within in normal music room.

Fine Motor Skills

Technology can support children's fine motor skills. Children who have physical disabilities were not able to hold instruments stable and by themselves. Using technology within music therapy sessions could help them hold and play instruments, which support their fine motor skills.

A Velcro Fastener helped children to hold instruments stable, and helped tie the instruments, such as shakers or bells on the children's wrists. For example, I divided shakers or bells for each child within the group music therapy session and encouraged them to shake instruments when provided with the 'Shaking song'. With Velcro Fasteners, children were able to shake or move their hands with instruments without worry that the instrument might fall down. Moreover, I found that the Velcro Fastener plays a significant role throughout group music therapy sessions. It led to children's improvement when there were a limited number of adults to support the children in my placement.

Sensory Stimulation

Sensory stimulation is the last category that emerged with regard to the role of using technology. Using technology within music therapy sessions with children who have physical disabilities can provide auditory, tactile, kinesthetic and visual sensory stimulation, which prompted various cognitive responses.

Auditory Stimulation

Using technologies within music therapy sessions enabled children to access auditory stimulation in various ways. A portable tablet was the main way of providing auditory stimulation for children in music therapy sessions. I observed children's responses when using the tablet with children in my clinical practice.

For example, in particular music therapy sessions, children hear words from the ACC and were stimulated to repeat specific words. Moreover, children could also receive auditory stimulation from playing videos through the iPad. For example, when I provided a video for a child in the particular music therapy session, their eyes and heads followed around when I changed the location of the portable tablet (for example, I normally move the tablet from left to right or right to left to facilitate children's head movements.).

In addition, children also accepted auditory stimulation from BIGmack from a recorded phrase with different songs. Children receive auditory stimulation immediately by pressing the button, which rewards their actions. From my observation, most of the children gave positive reactions, such as by smiling or clapping their hands after hearing the recorded phrase from BIGmack. Moreover, similar findings can be observed in the sensory room. Children could also receive auditory stimulation after pressing the button, which connects to the radio playing on it.

Kinesthetic Stimulation

Using technology within music therapy sessions enabled children to access kinesthetic stimulation. A resonance board within music therapy sessions facilitated children to feel vibration throughout the strong stimulation, which also rewards their action. The example below shows using a resonance board in music therapy session.

For example:

They were lying on the resonance board, I put acoustic instrument and drum on the resonance board around their body. Overall, they gave more responses than the previous session, which was run in the normal music room. For

example, the child gave more hands clapping, head movement, and eye gazing. In normal music therapy session, they usually gave responses after the beginning tow song, while I played a Ukulele in front of them. But with this particular session, with them lying on the resonance board, the child started to smile and clap their hands when I provided the hello song.

<div align="right">*Clinical notes 23rd July*</div>

In this music therapy session, I put a ukulele near the child's head. When singing the 'hello song', I played the string on the ukulele as well, which provided more stimulation for the child via the resonance board.

Another example explains that using resonance board provides profound kinesthetic stimulation for children. The child in the example was profoundly deaf and gave feedback when they felt the vibration.

For example:

I put the child on the resonance board and used an ocean drum, a guitar to provided vibration for them. I put an iPad besides their head with a video playing and I played the ocean drum, which gave their vibration stimulation to facilitate their head movement. The child gave positive responses, as they moved their head to the other side when I provided the music and drum beats. And when I changed the drum's position, the child moved their head followed by the changes.

<div align="right">*Clinical notes 25th March*</div>

In the music therapy session, I was not able to play instruments and beat the drum at the same time. I used an iPad playing a video on the resonance board, which also provided kinesthetic stimulation. Moreover, I played the ocean drum with strong beats at the same time.

Visual Stimulation

Using technology within music therapy sessions can provide children with visual stimulation in various ways. The board maker was a good way to provide children with visual stimulation. It has a clear, colourful image, which helped children to recognize objects easily. For example, within a music therapy session, I used a 'colour card' when providing the made up 'colour song'. In my observations, children watched different cards carefully through the song and also facilitated choice making and gross skills.

In addition, using ACC can also provide visual stimulation for children within a music therapy session. Compared with the Board Maker, the ACC contains different images in one screen, which might over-stimulate them. For example, in a particular music therapy session, the child pressed each image through the ACC when it was provided to them. The purpose of using the ACC was to encourage children to make choices via visual stimulation. However, the child pressed and listened to the sounds but did not make choices through the technology.

Similar findings happened in the sensory room, when children press the button that connected with the shining lights. (See the example below)

For example:

> *I set the child in a standing frame in the sensory room. The main observation for the child was they moved their head often with the shining lights. I changed the child's position each time when the lights turned off, and their head moved to the other side when the next time the lights turned on. The child seems to know how to turn the light on (by pressing the button) and their eyes caught the shining lights – observed from their head movement and eyes gazing.*

Clinical notes 24th July

I observed that the child attracted and watched the shining lights for quite a long time and their hands moved forward after the light turned off.

Interesting finding

During my clinical practice and data analysis process, I found three other 'interesting' findings, which seemed to not have been mentioned previously from other researchers: accompanying live music, causing overstimulation and not helping the participant calm down.

Accompanying

The most interesting finding was that using technology can accompany the live music, which helped me and children play another un-tuned percussion together. Portable tablets, such as an iPhone or an iPad provided children with musical stimulation, which motivated and rewarded their actions. For example, in a particular music therapy session, when I needed to hold the instrument, such as the big ocean drum in front of the child, the technology provided the background music for us. Moreover, I found that children seemed more engaged when provided with background music while I shared instruments. In my placement, there were not enough adult to help in many occasions. I normally facilitated individual music therapy sessions by myself. I observed that children were more likely to throw or turn over some percussion if I did not hold it.

Causing Overstimulation

Using technology sometimes frightened children in some particular scenarios. As I mentioned previously, a child became frightened and started crying when placed in the sensory room. After that session, I observed that the child cried unpredictably. Moreover, they seemed scared when I placed them into a narrow

space. For example, from my observation, I noticed that the student clenched their fist and shook their shoulders when they came in to the music room or cried when lying on a resonance board near the corner. It took nearly six months for the child to feel comfortable in the environment (March-September, 2018).

Technology is not readily calming

I also found that technology might not be helpful when trying to calm down children's emotions. Based on my experiences, some children in my placement easily became frustrated or anxious. I used acoustic instruments, such as a guitar with gentle songs to help the children calm down. For example, in a particular music therapy session, I tried using technology at the beginning. However, the child did not seem to engage and their shoulders shook more frequently.

Discussion

Overview

The aim of this research was to explore the role of using technology within music therapy sessions with children who have physical disabilities at a conductive education centre in New Zealand.

My research shows that technology can play an important role in music therapy sessions. This supports the views of Clements-Cortès (2014), Knight & LaGasse (2012), and Crowe & Rio (2004) that using technologies can play a valuable role when working with children who have physical disabilities within music therapy sessions, and it enhances the work for music therapists (Cevaso & Hong, 2011). I coded eleven 'roles', which were related using technology throughout my clinical practice. It included attracting attention, learning cause and effect, supporting communication, eliciting emotional reactions, making choices, encouraging motor skills and giving auditory, tactile, kinesthetic and visual sensory stimulation.

The different roles can be grouped into five themes. The most obvious theme to emerge from the analysis is that technology can support children's cognitive development. Within this theme, technology plays a role of including 'capturing attention', 'learning about cause and effect', and 'making choices'. Another theme related to the role was to support children's communication efforts. Moreover, using technology can encourage children to express emotions, support children's motor skills, such as gross and fine motor skills. The last theme I observed from my clinical job was that technology provided sensory stimulation for children, such as in 'auditory', 'visual', and 'kinesthetic'.

Functions of Different Technologies

The roles of technology identified in this research were similar with other studies, including using a Switch, a Portable Tablet, a computer and a Velcro Fastener.

Switches

The BIGmack and switches in the sensory room played a big role throughout my clinical practice. Switches and other control devices had been used for people with physical disabilities over the past few decades (Hahna et al., 2012). As mentioned in the literature review about using switches, the clients could press the button to turn on or off music or other objects, and to turn on the recorded music phrase (Knight & LaGasse, 2012). In my practice observation, I found that using the BIGmack provided opportunities for children to turn on or off music and recorded phrases, which supported them learning cause and effect. As noted by Clement-Cortès (2013), switch devices with recorded phrases were able to help participants with physical disabilities for emotional expression and to access music activities.

Portable Tablets

The function of using a portable tablet was in agreement with other authors views. The previous studies by Knight & LaGasse (2012) stated that using different apps on an iPad would able to encourage clients motors skills. I used an iPad throughout my clinical practice to encourage children to move their hands to touch the screen, which facilitated their motor skills. I observed that children were willing to touch the screen when the iPad was provided. Moreover, the authors also stated that apps were able to allow participants to receive a variety instruments (Knight, 2013) with their finger touch. Similar findings occurred in

my clinical practice. I used an app named 'Colour Band' with various sounds of instruments in it, which also facilitated a multi-sensory experience for children. I made a harp-shaped with different lines, which represented the various sounds of the instruments. When children moved their hands near the screen or to tap the screen, it made the sound clearly.

In addition, the study by Knight (2013) offered that ACC seemed to be a useful tool that can be involved within music therapy clinical practice, as participants can touch the screen to choose what they wish. In my observation, using ACC facilitated students to indicate their want or need.

Computer

My view of providing a computer within music therapy session was similar to other researchers. Clements-Cortès (2013) pointed out that using computers in music therapy sessions for children with physical disabilities is a good way to help them develop motor and music skills, and enjoy the music where they are not able to play instruments.

In one study by Crowe & Rather (2012), they made up own Sound Design Project within music therapy sessions, which facilitated children's movement. They also stated that using designed instruments created more opportunities for people who have multiple disabilities to play more easily. In relation to my clinical practice, I used a made up Foil-Drum with a Makey Makey to connect with my laptop, and children were able to feel and listen to the music by touching the surface of the Foil-Drum. It helped children develop their finger movement and recognize sounds of instruments.

Velcro Fasteners

I observed similar findings about using a Velcro Fastener within my music therapy session which relates to other research. A study by Crowe & Rather (2012) examined a case study of using a Velcro Fastener with clients who were diagnosed with Cerebral Palsy. The client was engaged in playing the shaker for up to 1 minute when using the Velcro Fastener. Even though I stated previously that using Velcro Fasteners sometimes made children feel frustrated, it did still help children to hold instruments for longer. For example, in a particular music therapy session with a child who was diagnosed with Cerebral Palsy, I used a shaker with a Velcro Fastener on the child's wrist. I played a guitar near the student to encourage them to shake the instrument. The student moved their wrist slightly to match the music. In another music therapy session with the same child without using a Velcro Fastener, I observed that when the child held the shaker with their own hands, the shaker fell off more easily, compared to when they had the Velcro Faster.

In addition, I observed that the Velcro Fastener plays a crucial role in a group music therapy session. A qualitative study by Crowe & Rather (2012) described the appropriateness of using Shaker Bracelets with group settings.

Own reaction

Self-Teaching

Throughout my clinical practice, I made or learned each technology by my self. A report also found that 61% of music therapists stated they were also self-taught when learning music technologies (Hahna et al., 2012). They also stated that many participants' responses indicated that more training was needed. I did not receive technology training throughout my study and clinical practice. Another

survey by Magee (2006) presented that the major barrier of using technology within music therapy was lack of training.

Based on my own reaction, I reflected upon three categories that few other researchers have mentioned before.

Purpose of using technology

During the opening several weeks of my practicum, I was willing to use technology as much as I could in music therapy sessions. However, it was not always the right way to use technology. One study by Knight (2013) described important considerations about using apps in music therapy sessions. It was necessary to question whether the apps are appropriate for participants' needs or not. Moreover, it was important to make a decision based on participants' needs, but not on the music therapists' own preferences about technology (Magee et al.,2011; Hahna et al, 2012). My discussions with my lecturer Dr. Daphne Rickson, second supervisor Carolyn Ayson, and visiting music therapist Fiona Hearn, led to my understanding that the reason for deciding whether or not to use technology should be based on the child's individual goals. It is necessary to consider children's needs before deciding which type of technology might be used within the music therapy session. As mentioned by Knight and LaGasse (2012), "'it' is not about us – it is about our clients" (p.194). For example, when the goals for the child is to feel vibration and enjoy movement. I may put the child on a resonance board, which can provide strong stimulation for them.

Technology is Not Suitable for Every Child

In addition, I learned that not every child was able to use any particular technology. For example, I used a Makey Makey that connected with my laptop

for student who had a severe physical disability. The child had no intellectual disability and can control her finger well when playing the Foil-Drum. However, other students in my placement were not able to control their behavior and sometimes pushed the wires, which can ruin the Makey Makey and laptop. Moreover, it was difficult for some children to press the small foil squares continually on the Foil-Drum.

In terms of using my own made up Foil-Drum, I tried to use bananas, apples and celery to connect with the Makey Makey. It normally took over three foods to link with the main board at the same time. However, some children who have severe physical disabilities were not able to move their hands to touch the fruit in a short time. Furthermore, other children would try to push or grab the food and put it in their mouths.

Expensive Technology

Cost for purchasing technological devices is another thing we need to consider. One study by Cevasco & Hong (2011) stated that some therapists find it difficult to purchase expensive technology immediately. Furthermore, in 2006, Wendy Magee indicated by her own survey that one barrier of using technology was the cost for music therapists. A recent study by Hahna et al. (2012) from their survey stated that music therapists have blamed their lack of financial funds for not using technology in their clinical practice.

My liaison introduced me to Sound Beam, which inspired me to think about using technology in my clinical practice. As a music therapy student, I was not able to afford expensive products, such as a Sound Beam. Knight & LaGasse (2012) indicated that Sound Beams 'instantaneously awards creative control' for the clients. However, it was unaffordable for both of us to buy a Sound Beam for

my placement. For example, I borrowed a Makey Makey from my supervisor and used it for over two months. After that I bought my own one from a Makey Shop, which cost over $100.

Summary of the Discussion

As mentioned previously, using technology may bring overstimulation for students or learners. This is not very encouraging, as the aim of using technology was not to scare the child. The reason for this finding is not clear but it may have need additional study in further research.

Although the findings focused on using technology within music therapy sessions, the findings may well have a bearing on providing live music in music therapy sessions, even though a variety of studies show that technology plays a large, crucial role within music therapy sessions (Clements-Cortès, 2014, Knight & LaGasse, 2012, Crowe & Rio, 2004). However, some of the music therapists reported that using acoustic instruments was important to retain the relationship between the client, therapists and the music (Hahna et al., 2012). In terms of building a bridge between the client, therapist and the music, participants were more likely to receive personal interaction via acoustic instruments within music therapy sessions (Whitehead-Pleux, Clark, & Spall, 2011; Clements-Cortès, 2013). Moreover, some researchers indicated that using musical instruments enable clients to make music easily (Crowe & Ratner, 2012). Furthermore, Ferrer (2007) demonstrated that live music can be effective to calm and reduce patients' anxiety.

Limitations & Further Research

This research provided me with opportunities to explore using technology within music therapy sessions. The findings have contributed to music therapy understanding of using technology within music therapy sessions. However, this

research was small and facilitated by just one music therapy student working in one setting.

The small number of children and limited time influenced my research. As I mentioned previously, most children in my placement were between ages 2-5, and were diagnosed with Cerebral Palsy, which influenced their physical abilities. My research mainly focused on these children, not including other age groups or condition issues. In addition, I spent nearly nine months in my placement working with these children, and used five months collecting data and four months for data analysis. Since the study had a limited time length, it was possible that the findings were not comprehensive and representative. A further study could assess more children and over a longer period of research.

Another weakness of this study was the scarcity of technology. I only provided seven different technologies in my practice work, therefore, it is unknown if providing other technologies would have created different views. Further investigation into different technologies is strongly recommended.

As a music therapy student, I was also a researcher, practitioner, observer and data analyst. I analyzed my research data based on my own interpretations. My own subjective analysis influenced the research process. The further research could use peer checking (someone else to observe or look at the data) to confirm my interpretations.

This research has thrown up some questions in need of further investigation. In addition, my interpretation of children's preferences during music therapy sessions might not be truly accurate. For example, further work needs to be done to establish how to define children's preferences within a music therapy session. I observed that children were choosing, based on their hand movements. However, it is hard to decide whether children were actually choosing or not.

Further experiments could use a broad range of technology or have longer periods of clinical work.

Conclusion

This research explored the role of using technologies within music therapy sessions with children who have physical disabilities.

This research was conducted at a conductive education centre in New Zealand. The clinical practice took nine months (from February to September in 2018). The research used qualitative analysis of secondary data which included my clinical notes and my own reflection journal. I used thematic analysis to uncover themes from my data.

The results of this research show that technology plays an important role within music therapy sessions. The most obvious finding is that technology can promote children's cognitive development, which includes capturing children's attention, learning cause and effect and making choices. This study also suggests that technology can facilitate children's communication skills and elicit children's emotions. Other significant findings also show that using technology in music therapy sessions can encourage children's motor skills and provide sensory stimulation. This research has contributed in several ways to my understanding of using technology within music therapy sessions and provided some ideas of how some technologies could be used. Future research could be conducted to further determine the effectiveness of using technology not only for children, but also with different age groups.

References

American Music Therapy Association. (2013). *Code of ethics.* Retrieved from: https://www.musictherapy.org/about/ethics/

Baker, F., & Krout, R. (2009). Songwriting via Skype: An online music therapy intervention to enhace social skills in an adolescent diagnosed with Asperger' syndrome. *British Journal of Music Therapy,* 23(2), 3-14.

Bates, D. (2014). Music Therapy Ethics "2.0": Preventing User Error in Technology. *Music Therapy Perspectives,* 32(2), 136-141. Retr ieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/ docview/ 1882383804/8762093 CABC543A3PQ/2?accountid=14782

BBs Boards-Supporting and promoting special education. (n.d.). Retrieved from: https://bbsboards.co.nz/products/resonance- boards-and-trays/

BIGmack. (2018). Retrieved from: http://www.inclusive.co.uk/ ablenet-big mack-p2039#

Boardmaker. (2019). Retrieved from: https://www.boardmakeronline.com/ Activity/3312428

Bruscia, K. E. (2005). Designing Qualitative Research. In B. L. Wheeler, (Eds.), *Music Therapy Research* (2nd ed.; pp. 129-137). New Braunfels, Gilsum, NH: Barcelona Publishers.

Bruscia, K. E. (2005). Topics and Questions. In B. L. Wheeler, (Eds.), *Music Therapy Research* (2nd ed.; pp. 89-93). New Braunfels, Gilsum, NH: Barcelona Publishers.

Cevasco, A. M., & Hong, A. (2011), Utilizing technology in clinical practice: A comparison of board-certifies music therapists and music therapy students. *Music therapy perspectives,* 29(1), 65-73. Retrieved from: http s://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/918965410 /E84D5915F5014D26PQ/1?accountid=14782

Children with serious conditions and special needs. (2018). Retrieved from: https://www.health.govt.nz/your-health/pregnancy-and-kids/ services-and-support-you-and-your-child/children-serious- conditions-and-special-needs

Clark, S., Spall, L. E., & Chitehead-Pleaux, A.M. (2011). Indications and counterindications or electronic music technologies in a pediatric medical settfing. *Music and Medicine,* 3(3), 154-162. Retrievedfrom: ht tps://search.proquest.com/iimp/d ocview/1636128146/5396 CE559D2E48F3PQ/1?accountid=14782

Clarke, V., & Braun. (2017) Thematic analysis. *The Journal of Positive Psychology,* 12(3), 297-298. Retrieved from: http://www-tandfonline-com.helicon.v uw.ac.nz/doi/f ull/10.1080/17439760.2016.1262613?scroll=top&need Access=true

Clements-Cortès, A. (2013). High-Tech Therapy: Music Technology in Music Therapy. *The Canadian Music Educator,* 54(4), 37-39. Retrieved from: https://search-pr oquest-com.helicon.vuw.ac.nz/iimp/docview/1412 576230/B76DBADC7A8944FE PQ/1?accountid=14782

Clements-Cortès, A. (2014). There's an App for That. The Canadian Music Educator, 55(4), 35-37. Retrieved from: https://search-proquest-co m.helicon.vuw.ac.nz/iimp/docview/1549546171/40C9A0303C35 4F05PQ/6?accountid=14782

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oals, CA: Sage.

Crowe, B., & Rather, E. (2012). The Sound Design Project: An Interdisciplinary Collaboration of Music Therapy an Industrial Design. *Music Therapy Perspectives,* 30(2), 101-108. Retrieved from: https://search-proques t-com.helicon.vuw.ac.nz/iimp/docview/1348605478/5686566C65584 598PQ/9?accountid=14782

Crowe, B., & Rio, R. (2004). Implications of technoogy in music therapy practice and research for music therapy education: A review of literature. Journal of Musis therapy, 41(4), 282-320. Retrievd from: https://search-proquest-com. helicon.vuw.ac.nz/iimp/docview/223566369/8C463E52EFC64FDAPQ /1?accountid=14782

Darrow, A. A. (2016). Developing a Topic. In B. L. Wheeler, (Eds.), *Music Therapy Research* (3rd ed.; pp. 47-55). ew Braunfels, Gilsum, NH: Barcelona Publishers.

Engelbrecht, R. B., & Shoemark, H. (2015). The Acceptability and Efficacy of Using iPads in Music Therapy to Support Wellbeing with Older Adults: A pilot Study. *The Australian Journal of Music Therapy,* 26, 49-70. Retrieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/

1705958535/D6830562BB34422CPQ/1?accountid=14782

eSpecial Needs. (n.d.). Retrieved from: https://www.especialneeds.com/shop/
assistive-technology/bigmack-communicator.html

Experia USA-Sensory Room. (2018). Retrieved from: https://www.experia-u
sa.com/sensory-rooms/

Ferrer, A. J.. (2007). The effect of Live Music on Decreasing Anxiety in Patients
undergoing Chemotherapy Treatment. *Journal of Music Therapy,* 44(3),
242-255. Retrieved from: https://search-proquest-com.helicon.vuw.ac.n
z/iimp/docview/223557371/5BDBCE2F0FC347A7PQ/14?accou ntid=14
782

Hahna, N.D., Hadley, S., Mellei, V. H., & Bonacentura, M. (2012). Music technology
usage in music Therapy. A survey of practice. *The arts in Physchoth erapy*,
39(5), 456-464. Retrieved from: https://www-sciencedirect-com.helic on
.vuw. ac.nz/science/article/pii/S0197455612001244?via%3Dihub

Human Ethics Guidelines. (to be read in conjunction with the Human Ethics Policy).
Research Policy Group. (n.d.). Retrieved from: https://www.victori a.ac.nz
/documents/policy/research-policy/appendix- a-huma n-ethics-
committee-guidelines.pdf

Hurst, K. (2018). *The Remarkable Resonance Board.* Retrieved from: http://w
ww.pathstoliteracy.org/blog/remarkable-resonance-board

Johnson, M. (2018). *What id Boardmker*. Retrieved from: https://mayer-joh
nson.com/pages/what-is-boardmaker

Knight, A. (2013). Uses of iPad Applications in Music Therapy. *Music Therapy
Perspectivse,* 31(2), 189-196.Retrieved from: https://search-proque st-
com.helicon.vuw.ac.nz/iimp/docview/1507269613/8762093CABC54
3A3PQ/3?accountid=14782

Knight, A., & LaGasse, A. B. (2012). Re-Connecting to Music Technology: Looking
Back and Looking Forward. *Music Therapy Perspectives,* 30(2), 188-195.
Retrieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/do
cview/1357485212/13042279C0A845D8PQ/1?accountid=14782

Krout, R. E., Baker, F.A., & Muhlberger, R. (2010). Information Sharing: Designing,
Piloting, and Evaluating an On-Line Collaborative Songwriting
Environment and Protocol Using Skype Telecommunication Technology:
Perceptions of Music Therapy Student Participants. Music Therapy

Perspective, 28(1), 79-85. Retrieved from: https://search-proquest-com.h elicon.vuw.ac.nz/iimp/docview/753578097/EA748E036CEC4BD0P Q/1? accountid=14782

MakeyMakey. (2018). Retrieved from: https://makeymakey.com/collections/ accessories

Magee, W., & Davidson, J. W. (2004). Music Therapy in Multiple Sclerosis: Results of a Systematic Qualitative Analysis. *Music Therapy Perspectives,* 22(1), 39-51. Retrieved from: https://search-proquest-com.helicon. vuw.ac.n z/ iimp/docview/1372605/494282705BDE4E95PQ/26?accountid=14782

Magee, W. L. (2006). Electronic technologies in clinical music therapy: a survey of practice and attitudes. *Technology and Disabilities*, No. 18(3), 139-146.

Magee, W. L. (2011). Music Technology for Health and Well-Being: The bridge between the Arts and Science (Editional). *Music and Meicine*, 3(3), 131-133.

Magee, W. L. (2014). *Music Technology in Therapeutic and Health Settings.* London, UK: Jessica Kingsley Publishers.

Magee, W. L. (2014). Using electronic and digital technologies in music therapy: The implication of gender and age for therapists and the people with whom they work. *Music, Health, Technology, and Design,* 8，227-241. Retrieved from: https://brage.bibsys.no/xmlui/bitstream/handle/11 250/279900/Using_electronic_and_digital_technologies_in_music_ther apy.pdf?sequence=1&isAllowed=y

Magee, W. L., & Burland, K. (2014). Developing identities using music technology in therapeutic setting. *Psychology of Music,* 42(2), 1770189. Retrieved from: http://journals.sagepub.com.helicon.vuw.ac.nz/doi/pdf/10.1177/ 0305735612463773

Mark, D. (2017). Where did interpretivism go in the theory of entrepreneurship? *Journal of Business Venturing,* 32 (5), 536-549. Retrieved from: https:/ /www-sciencedirect-com.helicon.vuw.ac.nz/science/article/pii/S088 390261730383X?via%3Dihub

Oldfield, A. (2010). *Interactive Music Therapy – A Positive Approach*. London, UK: Jessica Kingsley Publishers.

Rolvshord, R. (2010). Resource-oriented music therapy in mental health care. University Park, IL: Barcelona Publishers. Retrieved from: https://eboo

kcentral.proquest.com/lib/vuw/reader.action?docID=3117628&ppg=1

Schwartz, E. (2008). *Music, Therapy, and Early Childhood: A Developmental Approach.*CITY: Barcelona Publishers.

Smith, L. (2012). Sparkling Divas! Therapeutic Music Video Groups with At-Risk *Youth. Music Therapy Perspectives,* 30(1), 17-24. Retrieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/1143792154/5686566C65584598PQ/6?accountid=14782

Sussman, E. (2014). Inclusive Music Education. School Band & Orchestra, 17(4), 28-30,33. Retrieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/1556233986/40C9A0303C354F05PQ/28?accountid=14782

Te Whāriki. (n.d.). Retrieved from: https://www.ed ucation.govt.nz/early-childhood/teaching-and-learning/te-whariki/

Vega, V. P., & Keith, D. (2012). A survey of Online Course in Music Therapy. *Music Therapy Perspectives,* 30(2), 176-183. Retrieved from: https://https://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/1357485210/5686566C65584598PQ/2?accountid=14782

Wheeler, B. L. (2005). *Music Therapy research, Second Edition.* New Braunfels, Gilsum NH: Barcelona Publishers.

Wheeler, B. L., & Kenny, C. (2005). Principles of Qualitative Research. In B. L Wheeler, (Eds.), *Music Therapy research* (2ne ed.; pp. 59-71). Gilsum NH: Barcelona Publishers.

Wosch, T., Trondalen, G., & Erkkilä, J. (2016). Microanalysis in music therapy: objectivist and interpretivist approached and methods 2016. *Nordic Journal of Music Therapy*, 25, 112-116. Retrieved from: https://search-proquest-com.helicon.vuw.ac.nz/iimp/docview/1800385560/E221FAC359994001PQ/3?accountid=14782

Appendix 1: Consent Forms

<u>**Facility consent form**</u>

<u>Research title:</u> The role of technologies within music therapy sessions with preschool children with physical disabilities at a conductive education centre.

- I have read the information sheet and have obtained sufficient information about the study.
- I understand that from the review of clinical notes students' real names and details will not be used in any publication or presentation arising from this research.
- I understand that information consent will be sought from families should a particular case vignette be need to illustrated the findings
- I understand that research data will be kept for five years and will be stored securely at the New Zealand School of Music and/or on a password-protected computer.
- I acknowledge that the study may be presented at conferences and/or in published papers, and will be published in the library at Victoria University.
- I understand that I can contact Yutong Gao's research supervisor Dr. Daphne Rickson if I have any concerns or questions relating to the research.
- I also understand that I can contact the Victoria University of Wellington Human Ethics Convenor if I have any other concerns about this research.

YES/NO

I therefor consent to Yutong Gao reviewing clinical notes and records that were kept during her work at _____for her research.

This has been discussed with me by Yutong Gao (researcher).

Signed_____Date:_____

Parent/caregiver consent form

Research title: The role of technologies within music therapy sessions with preschool children with physical disabilities at a conductive education centre.

- I have read the information sheet and have obtained sufficient information about the study.
- I understand that my child's real name will not be used in any publication or presentation arising from this research.
- I understand that research data will be kept for five years and will be stored securely at the New Zealand School of Music and/or on a password protected computer.
- I acknowledge that the study may be presented at conferences and/or in published papers, and will be published in the library at Victoria University.
- I understand that Yutong Gao will de-identify material relating to my child and family in reports and therefore we will not be identifiable.
- I understand that I can contact Yutong Gao's research supervisor Dr. Daphne Rickson if I have any concerns or questions relating to the research.
- I also understand that I can contact the Victoria University of Wellington Human Ethics Convenor if I have any other concerns about this research.

YES/NO

Therefore I give consent for the following materials related to my child's music therapy sessions to be used in a case vignette to illustrate the findings of the research:

I agree/do not agree *(please circle one)* to the use of my child's clinical notes and written material.

I agree/do not agree *(please circle one)* to the use of my child's session videos.

I agree/do not agree *(please circle one)* to audio recordings of my child's songs/improvisations.

This has been discussed with me by_____.

Signed_____Date:_____
(caregiver/s)

Print name_____

Appendix 2: Information sheets

Facility information sheet

Research Working Title:
The role of technologies within music therapy sessions with preschool children with physical disabilities at a conductive education centre.

Dear‗‗‗‗‗

I am writing to you to ask permission to review my clinical notes and records that I have kept during my work at‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗‗ for my Masters research. It is possible that I may also seek your assistance in approaching families for informed consent should a particular example be needed to illuminate the findings. This would involve taking parents and students through the information sheets (please find attached) and asking permission from the parent and child.

For my Masters research, I have chosen to explore the role of using technologies within music therapy sessions with preschool children with physical disabilities. This research will help therapists by illuminating how technologies may impact children in the therapeutic process

All written records and consent forms for this research will be stored in a locked cupboard at the New Zealand School of Music. Electronic information will be kept on a password-protected computer. All records will be kept for five years and access will be restricted to the investigator and her supervisors. After five years it will be destroyed. It is your right to withdraw information from the research up until the end of data analysis. The proposed date for this is November 2018.

I will present the research findings to my examiners at the end of my Masters and I may also present the research at other conferences, if appropriate. The findings may be published in suitable music therapy or other professional journals. Victoria University library will have available copies of the exegesis and it will also be available in an electronic repository.

The Victoria University Human Ethics Committee have given approval for this research. The Ethics Application number is 22131. Daphne Rickson will supervise the project. If you have any concerns about the conduct of this research, please contact the supervisor (see email address below) or, if you wish to raise an issue with someone other than the researcher or supervisor, please contact the Victoria University Human Ethics Committee Convenor AProf Susan Corbett, email susan.corbett@vuw.ac.nz, phone +64-4-463 5480.

If you are in agreement with me reviewing records generated at your facility/school, please sign both copies of the enclosed consent form and return one to me. Please do not hesitate to contact my primary research supervisor, Daphne Rickson, if you have any questions or wish to discuss this further. Ph: 04 463 5233 x 35808 or email: daphne.rickson@vuw.ac.nz

Yours sincerely,

Yutong Gao

Master Student Victoria University

Ph: 0221643874 or email: yutongjane129@gmail.com

Parent/caregiver information sheet

Research Working Title:
The role of technologies within music therapy sessions with preschool children with physical disabilities at a conductive education centre.

Dear_____(parent/caregiver),

I am writing to you to ask permission to review…………………………'s (your child's) music therapy notes, videos, and music as part of my Masters research and to write and present what I have learnt. I will be looking at the recordings and notes to learn about my own approach, rather than studying ………………………………….. (name).

For my Masters research, I have chosen to explore the role of using technologies within music therapy sessions with preschool children with physical disabilities. This research will help therapists by illuminating how technologies may impact children in the therapeutic process.

I would like you to know that if your child is still receiving music therapy there would be no changes to ……………………'s music therapy. This research will be discussed with your child in a way they can understand and I will not proceed without their consent/assent. Please be assured your family's consent for this is voluntary. There will be other people I can ask if you want to say no.

We will keep all the notes and consent sheets in a locked cupboard and computer records will have a protected password so that only I can access them. The notes and consent forms will be kept securely for five years at the New Zealand School of Music. I will use a different name for ……………….. and will not mention your family or the school's name or location details in any publication or presentation of the research. If you change your mind about giving consent, you can do so up to the end of my detailed study.

I will present my research in thesis form for my examiners at the end of my Master and I may also present the research at other conferences. The findings may be published in a professional journal. Victoria University library will have available

copies of the thesis and it will also be available in an electronic repository. You can have a copy of the results of the research and the section that applies to ………………… if you request it.

The Victoria University Human Ethics Committee has given approval for this research (22131). Daphne Rickson will supervise the project. If you have any concerns about the conduct of this research, please contact my supervisor or, if you wish to raise an issue with someone other than the researcher or supervisor, please contact the Victoria University Human Ethics Committee Convenor AProf Susan Corbett, email susan.corbett@vuw.ac.nz, phone +64-4-463 5480.

If you are happy to say yes to me using ………………….'s music therapy records, please sign both copies of the enclosed consent form and return one to me. Please contact me or my research supervisor, Daphne Rickson, if you have any questions or wish to discuss this further. Ph: 04 463 5233 x 35808 or email: daphne.rickson@vuw.ac.nz

Yours sincerely,

Yutong Gao

Master Student

Victoria University
Ph: 0221643874 or email: yutongjane129@gmail.com

Appendix 3: Example of data analysis

Raw Data:

A	B	C	D
4-Apr	Name: Tom. Date 4 April. Duration: 40 mins Focus area: clam down head move & attract attention Based on the precious experience, he felt scared when he came to the music room, nearly cry and shake his shoulder. Seems he remember last week. Structure: keep using guitar playing gentle songs and chords to helped him calm down. After 10 minutes, he gave the first smile. And during the first ten minutes, he nearly cry for few times., even I use wind chime, it still no use. I used iPad playing a song one time during this time period, to make music moving, and I could use wind chime touch him. After 20 minutes to the end, he never want to cry any more. And made the first sounds. When I sang the song with the sounds from him, like 'a', 'ye', he followed to a new one. Nearly finish the session, I use the iPad and wind chime, he gave more reaction than last time.Use technology for twice: 1. In order to make music moving when I show him the chime. React less. 2. He kept listen and watch, more reaction, smile lot. Reflection: technology could help keeping structured, profound music moving, when I prepare to use other stuff to catch his attention. For example, I could not paly guitar and show him the chime at the same time. On the other hand, the scared of joining in the sensory room, make him feel scared when coming in the narrow room. It may be an issue, the bad influence for him – feel afraid in the narrow room. He never feel afraid when coming to the music room at the first several weeks, before he went to the sensory room last week.		

Initial coding:

A	B	C	D
4-Apr	Name: Tom. Date 4 April. Duration: 40 mins Focus area: clam down head move & attract attention Based on the precious experience, he felt scared when he came to the music room, nearly cry and shake his shoulder. Seems he remember last week. Structure: keep using guitar playing gentle songs and chords to helped him calm down. After 10 minutes, he gave the first smile. And during the first ten minutes, he nearly cry for few times., even I use wind chime, it still no use. I used iPad playing a song one time during this time period, to make music moving, and I could use wind chime near him. After 20 minutes to the end, he stopped the feeling of crying. And made the first sounds. When I sang the song with the sounds from him, like 'a', 'ye', he followed to a new one. Nearly finish the session, I use the iPad and wind chime, he gave more reaction than last time.Use technology for twice: 1. In order to make music moving when I show him the chime. React less. 2. He kept listen and watch, more reaction, smile lot. Reflection: technology could help keeping structured, profound music moving, when I prepare to use other stuff to catch his attention. For example, I could not paly guitar and show him the chime at the same time. On the other hand, the scared of joining in the sensory room, make him feel scared when coming in the narrow room. It may be an issue, the bad influence for him – feel afraid in the narrow room. He didn't feel scared in the music room, before cried in the sensory room.	attention (need time)	iPad