Reflection on the Practical Value of Digital Technology Empowering Music Therapy from the Perspective of Music Education

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Abstract. Music education should not be confined to applying clinical tools in music therapy; other ways can also be used to help regulate emotions and develop aesthetics, etc. Digital technology has developed recently. Online platforms, digital audio workstations, mobile applications, intelligent recommendation systems, wearable devices, virtual reality and artificial intelligence have all changed how music is selected, created, recorded, analysed and used in education and therapy. Research on how to improve the effect of music therapy in music education through digital technology. First, this part will introduce the connection between music education and music therapy, and then list specific applications of digital technology and artificial intelligence (AI) in the evaluation and selection of interventions, individualization, construction of interactive learning spaces, and resource sharing. Based on the above, this paper will discuss the role of digital technology in promoting participation, providing support for emotional regulation, serving inclusive education, extending learning spaces, and strengthening cooperation among teachers, therapists and families. At the same time, it can also be seen that technology should not replace care for people and music. The following are the problems of privacy protection, algorithm bias, cultural differences and the genuineness of emotional experience in the application of artificial intelligence (AI) in music therapy. Although digital technology can increase the convenience and accuracy of music therapy, it is only educationally beneficial to a certain extent and should be incorporated into a human-centred, ethical and musically meaningful practice system.

Keywords: Music Education, Music Therapy, Digital Technology, Artificial Intelligence, Emotional Regulation, Inclusive Education, Human-Centred Practice.

1. Introduction

Music education has always aimed to promote students' sense of music and improve all-around musical skills, aesthetics, culture and life skills. The functions of music education in many schools and communities are not limited to skills training. Singing, listening, improvising and group performances can all help to foster students' emotions, a sense of social responsibility, and memories of life together. Therefore, more studies need to be conducted on how to apply music education in music therapy. Music therapy is generally conducted by trained professionals for therapeutic reasons, while most music education aims to teach and learn. However, both are based on the same idea: music can affect the body and mind through rhythm, melody, timbre, movement, memory, and so on, as well as by social interaction. Music education that is aware of students' emotions and different stages of development can often be closely related to applications in music therapy.

The development of digital technology has created more explicit connections. In the past, music therapy was generally carried out face-to-face, using live instruments, printed scores, and only the individual experience of the therapist. The above are still required conditions, but they are no longer necessary conditions for use. Now, teachers and therapists have built digital platforms to store music materials, record students' answers, design interactive exercises, offer online instructions, and share homework for home practice. Artificial intelligence can be used to analyse sound, recognise emotions, recommend suitable music based on a person's preferences, create accompanying music and provide personalised learning support. Therefore, AI will not be seen as an end in itself but rather as part of the development of digital technology applications in music therapy.

The level of benefit of empowerment in music education should be assessed based on both educational goals and technical feasibility. Although a digital tool is convenient and appealing, if it

reduces students' desire to learn actively, shows fewer emotions, and lacks human interaction, it will be less effective. At the same time, an easy-to-use recording application or an AI-assisted music selection system could be used to help students express themselves and join the music class for the first time. Therefore, this paper does not consider digital technology as a replacement for teachers and therapists. Technology can be employed to extend the reach and improve the quality of music therapy and education responsibly.

The issue that this paper will address is how to promote music therapy through digital technology in the context of music education. At this time, the following three problems have been found. The first is the connection between music education and music therapy in theory. The second is a practical application of digital technology, such as AI for assessment, intervention and learning support. The third is an analysis of the value and shortcomings of the above technologies. Based on the above discussion, this paper believes that the practical value of digital technology is to promote individualised, accessible, interactive and evidence-based qualities in music therapy, but at the same time, it should still be centred on people and education.

2. The Relationship Between Music Education and Music Therapy

Music education and music therapy are not the same in terms of professional identity, goals and evaluation standards. Music education aims to help students build all-around musical intelligence through hearing, expressing, appreciating, creating and understanding culture. According to the descriptions of foreign professionals, music therapy is employed to help people meet their physical, emotional, cognitive and social needs through music and musical experiences in a therapeutic relationship [1, 2]. The two are not the same; one is mainly concerned with education, and the other is about health and intervention. However, the boundary is not strictly closed in practice. Music classes can reduce students' anxiety and boost their self-esteem, and activity classes for students with singing, rhythm or aesthetic problems are also available. Both areas are interested in the entire person in the same way.

Music education seeks to express emotions through the learning of music at a school level. Students do not view music solely as a system of notes and techniques. The affected people are having problems with memory, habits, anxiety, preferences and a sense of self. The child may not be able to sing because they are afraid of being judged, not because they are incapable of singing. A student with autism has difficulty with speech, but they respond well to music that is rhythmic or has a simple tune. A young person in the pressure of school will listen to music to relieve stress. Therefore, music education does not only focus on the assessment of performance. Thus, a secure environment will be created for expression and socialisation.

Music therapy provides some good paths for music education. Receptive listening, guided imagery, improvisation, rhythmic entrainment, songwriting and group performance can all be reasonably applied in educational settings [3-5]. For example, a teacher can have students participate in a steady-beat activity to help them focus for a while before class, or use simple improvisation to have them express their feelings in a new way. Such activities are not intended to make teachers clinicians, but rather to expand the educational functions of music. Music can help students regulate their emotions and take part in society at the same time that they learn.

Music education can also provide cultural and developmental support for music therapy at the same time. Music therapy will be ineffective if the musical background, age, culture and aesthetic preferences of the learners are ignored [5]. A song that pleases one student may be out of touch with the rest. A lively-sounding rhythm in one section of a work may be different elsewhere. A wider range of works and materials for listening can be used in music education to promote therapy and foster cultural literacy among young people for social participation. Schools are typical cases, and music therapy activities need to be integrated into the normal learning environment of the school.

The connection between the two areas is closer in inclusive education. Students with disabilities, emotional difficulties or developmental differences need to have a sense of belonging in learning and

not be excluded from the regular life of the school. Music is suitable for inclusive education because various degrees of participation are possible. One student sings a tune; another plays a simple rhythm on percussion instruments; a third moves or makes sounds with a digital device. Therapeutic ideas in music education can be used to help organise the various talents of the students in the class. Digital technology can also offer flexible tools and other forms of participation in the above activities [7, 15].

3. Forms of Digital Technology Empowering Music Therapy

Various supports are provided by digital technology for music therapy. First, add more resources. Teachers and therapists can get all kinds of music materials from the online music library, streaming platform and digital archive. Digital resources can be chosen according to people's own wishes and are not limited to a fixed list of school songs. A student who is relaxed when listening to folk music, a child who likes game music, and an older learner who can connect with songs from their youth can all receive more suitable materials. Preferences in music therapy are also problems. Familiar and meaningful music are more likely to be emotionally or memorably linked to people than random music [2-3]. Digital platforms can be used to provide personalised assistance more conveniently.

The second is digital creation and interaction. Digital audio workstations (DAWs), loop stations, tablet instruments and music-making applications can all be used by people without traditional instrumental training to create sound. It will be convenient for the school. Some students are too shy to be on stage, so they will use loops and record voices, adjusting the speed or adding sound effects with tablets instead. Touch screens and adaptive controllers can be used for students with motor disabilities to reduce the effort they need to exert during participation. Students who are not confident in their work can use digital editing tools to revise and complete a piece of music gradually. Therefore, technology can support the expression of emotions and educational objectives, as well as AI-assisted creation and feedback [10-11].

The third is recording and feedback. Most of the emotional and behavioural changes in traditional music education are informal. Digital tools can be used to record audio and video of attendance, exercise time, self-rated mood, etc. A teacher can observe any changes in a child's voice in several weeks; a therapist may monitor how long a child can focus on rhythm at home; and a family can keep a record of at-home listening activities to share with the school. These records should not be treated as such, but they can help practitioners observe a gradual change that would otherwise go unnoticed. The data are used to support thinking, but they are not the final answer.

Artificial intelligence is relatively new, but it has developed at an accelerated pace in recent years. The following are the four applications of artificial intelligence in music therapy mentioned in this paper. First, it can help observe the sound features of tempo, range of pitch, loudness and rhythm. The reasons for the above traits may be attention, coordination of movement or emotions. Second, based on a user's preferences and previous listening records, the AI will recommend other music. Thirdly, generative AI can produce various types of easy-to-use accompaniments, relaxation soundscapes and practice materials at different speeds and styles. Fourth, AI-based emotion recognition can be used in conjunction with other sources of data to obtain more information on facial expressions, voice characteristics, and so on. The above functions can meet the various demands and different response patterns of students in music therapy more flexibly [10, 11].

AI is only a tool for help and should not be considered an end in itself. A recommendation system can recommend relaxing music, but it does not know why a student does not like a certain song. A generative system can produce background music, but it does not have a link with teachers and students. Emotion recognition can identify external expressions of emotions, but the reasons for these emotions are often complicated, culturally diverse and sensitive [12]. Therefore, this deficiency is relatively minor in music education. The purpose is not for the AI to determine what the students need, but to help teachers and therapists reasonably organise materials and hints for the students. The teacher's questions always seek to enable students to actively participate, express themselves, be heard and learn in a different way.

Virtual and augmented realities have also started to be applied commercially. Virtual environments are also suitable places for people to relax, move, have guided imagery and create. For example, a student can enter a virtual forest with slow music and breathing guidance, or join a virtual ensemble to produce music by making various movements. Therefore, some students will find them more interesting and less stressful than the normal classroom learning. Immersive technology should be applied in a limited way. If the virtual scene is placed before the music and relationships, it may no longer be healing. Direct the students' attention to the lesson and have them think.

Wearable devices and bio-sensors are also being employed. Sometimes, the doctor knows how quickly a child's heart is beating, whether they are lively, and how well they are sleeping in music class. Wearable devices can be employed in relaxation training to record changes in a person's breathing and heart rate during deep-breathing exercises. Rhythm-based activities may vary in the movement sensor data over time. Such information can make the intervention more targeted, and expanded digital mental-health research has provided support for the cautious and purposeful use of technology [9]. It will not help the people. Do not collect sensitive data from students without a specific reason, consent and protection measures. Digital empowerment should not be digital surveillance.

4. Practical Value from the Perspective of Music Education

The first is to expand the scope of application. Participation in music education is the start of learning. Some students are not participating in music class because they cannot read music symbols, do not have instruments, are afraid of performing in front of others, or have other health problems. Multiple ways to enter music via digital technology. A student can select sounds, arrange loops, tap a rhythm on a screen, adjust the volume, record spoken words or respond with body language. Although the above behaviours may seem simple, they enable students to participate in the creation of music. Some groups of anxious people are learning to cope with their mental health problems and express themselves.

The second is regulation of emotions. Music can move people's emotions by arranging time, tension and release, etc. Digitally, we will be able to strengthen support for mental health more conveniently. Some students may have been listening to guided-listening playlists for in-depth study, recording their own songs after class, or using AI-powered applications to select relaxing or concentration-enhancing music before the test. Teachers can create a quiet small-group environment in class with digital soundscapes or organise rhythm games for the students. The above measures will not be a substitute for psychological counselling but can provide daily mental health support in schools. Research on music therapy for depression and anxiety has shown that music-based interventions can reduce symptoms and improve functioning, and systematic reviews of stress-related outcomes have also reported positive effects of some music interventions [6][13]. This offers support for the cautious use of educational measures.

The third is personalised services. The teaching materials and speed of all students in the traditional music class are the same. Music therapy is for people. Digital technology is employed to bring in personalised logic for music education. AI systems can recommend songs of different tempos and emotional qualities; software can adjust pitch, speed and difficulty; digital portfolios can display the progress and preferences of each student. For a student with inattention, a short rhythmic exercise will be more suitable than a long-listening task. Songwriting with digital instruments may be a relatively low-stress way for a student with low self-esteem to express themselves. Personalisation does not mean meeting all the demands arbitrarily. Flexibly connect the educational goals with the students' actual lives.

The fourth is support for inclusive education and special education. Music therapy has also been applied to help autistic children and other groups of people, such as those with depression and older adults. Reviews of music therapy for autistic people have reported that there may be some benefits in certain areas, such as the global improvement and quality of life, but have also pointed out that the

certainty of the evidence varies and more research is needed [7]. Based on the trial results, there was no improvement in symptoms [15]. Digital technology can be used to realise the above contents in inclusive education. Visual rhythm interfaces, adaptive instruments, simplified composition software and interactive movement games can all be used to help students with learning disabilities in traditional music classes. Not all students need to perform the same; different musical roles can be given to them in the same activity. It will be all-encompassing and polite.

The fifth item is the expansion of learning and therapy areas. Digital platforms can provide support for music education outside of school hours as well. A teacher can organise listening-and-reflecting activities; a therapist can give parents some homework material; parents can watch how their children respond to certain songs. If face-to-face classes are not possible, other modes of online learning and asynchronous learning will be used. Reviews of music-based interventions for adolescents and young adults also include their application in the treatment of mental illness and improvements in mental health [8]. Remote music therapy also has some deficiencies. A poor-quality speaker system or a small group can be employed to reduce the enjoyment of music class. Digital resources can also be used by students in remote areas or those who do not have easy access to them. Design some interesting offline activities that do not require a computer, and move the offline session out of the computer room.

The sixth is cross-disciplinary cooperation. Many people need to be involved in school music therapy, such as music teachers, psychologists, special education teachers, doctors, family members, etc. Digital platforms can support the storage of records, communication and resource management. A music teacher will note down classroom changes; a counsellor sets emotional targets, and parents will report on behaviour at home. AI tools can help summarize the patterns, but the final interpretation should still be carried out by people who know the learners better. Thus, digital technology will be able to support the cooperative network of students. It will be possible to build an extended system of music education services for young children.

The seventh is the growth of students' digital and musical literacy. Students use digital tools to create, modify and explore music in new ways, and learn about new ways of conducting music. They know that digital sound has been created and changed. AI can be employed to discuss the questions of authorship, originality, bias and responsibility among students. Therefore, we need to learn how young people are using AI-generated music, algorithmic playlists, short-video sound cultures, and so on. Music education should not be limited by technology. Instead, help students learn to use them in a critical and creative way, and recent research on AI music education has pointed out both opportunities and challenges [10, 11]. Through therapy activities, the students will learn how to use technology for self-care and communication with others, and other kinds of support.

5. Reflection on Problems and Limitations

Digital technology is convenient, but it also has problems. The first is a shortage of technology. If teachers and therapists use applications, playlists or AI recommendations too frequently, they will be unable to feel music in their hearts. Music therapy has the power of sound, and it can be used in a responsive way through sound [2, 3]. A therapist notices hesitation, slows down, leaves a silence, joins in with improvisation, and responds emotionally. According to the change in mood of the students, teachers will adjust the class activities. The following decisions will not be carried out by the software. Therefore, digital technology should serve the living musical life and not take the lead.

Secondly, the emotions are too basic. The kinds of emotions generally classified by AI systems include happiness, sadness, calm, and so on. The categories are easy to organise, but real emotions are not so simple. A student may enjoy a sad song because it can make them feel better; another person may feel anxious when listening to supposed-to-be-relaxing music; and a cultural tune carries memories of family life that no algorithm can learn. Practitioners have not been trained on AI labels and do not know what they are. Music education can help students learn through conversation, listening and so on. Technology offers the clues; learners need to find the emotions by themselves.

The third is privacy and ethics. Music therapy may contain sensitive information, such as mental health, disabilities, family circumstances and physiological data. Set rules for consent to saving recorded events and mood data on the digital platform, and provide options for access and deletion. The students should not believe that all feelings will be reported. Parents and schools need to know what data will be collected and why. AI tools are also raising problems of training data and algorithmic bias. If the system is trained on only a few kinds of music, it will not be able to recommend other music for all users. The ethics of this will require openness and human supervision, and this aligns with the general direction for digital mental health and generative AI in education [9, 12].

The fourth is an uneven distribution. Digital empowerment may also increase the gap in resources between well-equipped and under-equipped schools. Some institutions have obtained the new-generation software, sensors and virtual reality devices; others are still using basic computers and mobile phones. If digital music therapy is required by high-cost equipment, many students will be left out. Therefore, the practical design should be in line with appropriate technology. A low-cost recording device, a shared online folder, or a simple rhythm application might be more feasible for teachers to use than a full-featured system. The worth of technology is relative and not about money.

The fifth problem is professional boundaries. Music teachers may be able to apply some ideas from music therapy, but they should not offer it as professional counselling services. Digital tools can also make this line blurry, and many of them use therapeutic language in their advertisements. Distinguish between music-based educational support and formal therapy for schools. Music can help the school reduce stress, and otherwise, many students will have difficulty focusing on their studies and may be emotionally disturbed. AI-generated recommendations are not to be regarded as medical advice or a plan for treatment. Separate space for students and teachers.

The sixth problem is the actual situation of music experience. Generative AI can create music rapidly, but speed does not guarantee meaning. The creation of sound is often more important than the resulting music in music therapy and music education. A student's slightly off-key singing may have more emotion than a perfect one produced by AI. A group rhythm has been developed by trial and error, laughter and adjustments, and will have a stronger social connection than perfect digital accompaniment. Therefore, AI-generated music should be used to enhance the creativity of people, not to replace it. Encourage students to revise, question and personalise the output of artificial intelligence to create music in line with their own lives [10-12].

6. Strategies for Better Integration

To help school-based and community-based music therapy during times of crisis, many measures have been introduced overseas. First, set the educational and therapeutic goals of learning to select tools. Choose technology based on the requirements of the learners, rather than newness. To reduce stress, one can select a medium-difficulty guided-listening task. If one wishes to participate in group work in society, then group digital percussion is a suitable option. If one wishes to express oneself, then programmes for composing music and recording devices can be used. Defined objectives help prevent technology from becoming decorative.

Secondly, one may have people and be helped by artificial intelligence. Artificial intelligence can prepare the materials and analyse the patterns to offer some options, but the teachers and therapists will make the final choices. For example, although an AI system can recommend several songs with the same tempo and other features, teachers should also consider the lyrics, cultural connotations, personal memories and the actual circumstances of the classroom. A generative tool can generate the music for students, but they should also be able to modify it. This human-AI cooperation is to promote the technical efficiency and educational responsibility of music education, and it believes that AI in music education should support learning, practice, assessment and creation without replacing professional pedagogy [10-12].

The third is to plan the participatory activities. Digital music therapy should not be about passive reception of sound for students. Provide the students with some choices and have them experience making them. They can observe how different speeds change people's emotions, record sounds in their private diaries, create a class-wide calming music list, and express themselves with electronic instruments. A reflector will be required here. After the music activity, the students can talk about what they have heard and felt, as well as how the technology made them feel. Therefore, music education will use digital tools, and they will not be presented as a system of control.

The fourth is the organisation of teacher training. Many music teachers are willing to use technology but lack the confidence to apply it in therapy, as well as data ethics and AI tools. Therefore, the training contents should cover the foundation of music therapy, inclusive education, digital sound production, AI literacy and privacy protection. Teachers do not need to be engineers; they only need to know what the tools are and what they are not. They are also looking for some examples of low-cost classroom practices. Professional development can foster cooperation among music teachers and certified music therapists by employing the reference system of an official music therapy handbook and current AI education guidelines [3, 10, 12].

The fifth is to build an integrated method for data and stories in evaluation. Quantitative records are attendance, frequency of practice, mood scale and interaction time, etc. However, the reasons people want to learn music are often tied to stories; for example, a quiet student may begin singing softly, the group learns to listen to each other, and a child can safely express anger through rhythm. The two are observable indicators and unobservable attributes. Digital records can be used to collect detailed information on the growth of a child for teachers and therapists. Therefore, a general assessment will be carried out because the groups of people have had different experiences [6-8, 14].

The sixth measure should be in accordance with the above ethics. A platform will be used by the school to reduce the volume of collected data, and students' informed consent will be obtained to protect their privacy. Label AI-generated content when necessary and inform the students that they are interacting with machine-generated materials. Respect all kinds of cultures. Music for therapy-related education should not only be algorithmically popular songs, but also local and traditional works, as well as materials selected by students. Moral conduct should be the foundation of digital empowerment.

7. Conclusion

Based on the results of research on the application of digital technology in music therapy for music education, the values of this technology are all-encompassing, including practicality, education, emotion and morality. Digital platforms, mobile applications, digital instruments and recording systems, VR environments, wearable devices, AI tools, etc., have all added more resources, methods and places for music therapy. They can help teachers and therapists provide personalised activities to improve their participation and support emotional regulation; at the same time, they also serve the goal of inclusive education and strengthen cooperation among schools, families and professional services. Thus, digital technology has some actual applications in life.

However, it is not generalizable. Technology cannot substitute for the people in the lives of those who receive music therapy, and AI does not understand the deep cultural and personal meaning of music. Digital tools are employed to suppress emotions and privacy, thus increasing the gap and inhibiting the expression of music. Thus, the construction of music education should be all-round. It should not be afraid of technology out of anxiety nor worship it out of novelty. Digital technology can be used to promote human-centred musical education at this time.

In the future, music teachers will work with music therapists, psychologists, families and technology designers to develop safe and meaningful models of practice together. Artificial intelligence will be used for music recommendation, creation and study, but not to replace people. Finally, we hope to enable the students to learn better through listening, express themselves more freely, regulate their emotions more well, and actively participate in musical life. Under the guidance

of educational care and professional ethics, digital technology can be used to strengthen the support system for music therapy and promote all-around development in music education.

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