The Impact of Music Activities in a Multi-Sensory Room for Children with Multiple Disabilities on Developing Positive Emotions: A Case Study

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Abstract

The idea of a Multi-Sensory Environment (MSE) is not only to provide stimulation for users with disabilities, but also to be calming. Through many studies by the research team, the results had proven the effectiveness of using music activities in multisensory environments for children with various types of disabilities. The purpose of this study was to duplicate the use of the multisensory environment teaching approach with music activities on developing positive emotions and other areas of development for a child with multiple disabilities. A three-year-old boy with multiple disabilities was selected by purposive sampling to participate in the study. This was a twelve-week study, with fifty minute sessions once per week in a group setting. Prior to the formal teaching, four observations were taken to determine the participant’s current condition. Both qualitative and quantitative methods were used to assess the results. The findings showed the positive impact of using music activities on increasing positive emotions for the participant in the multisensory environment. Furthermore, the findings related to the participant’s communication skills, social interaction with peers and level of intelligence were improved when the research sessions were assessed.

Keywords: Music Activities, Children with Disabilities, Emotions, Multi-Sensory Environment

Introduction

Background

The idea of a multi-sensory environment (MSE) is not only to provide stimulation for users with disabilities, but also to be calming. The main purpose of using an MSE is to provide a failure-free experience, allowing enjoyable stimulation without the need for verbal abilities or requiring specific outcomes. The focus of an MSE is to help the user gain the most benefit and enjoyment from the sensory activity they are involved in.

Using a multi-sensory room, therapists, teachers and parents can help assess a child's sensory problems, leading to frequent improvements to quality of life, and to find effective new treatments. Studies have shown that multi-sensory environments alleviate stress, anxiety and discomfort for children with disabilities such as autism,
brain injury, mental illness and challenging behaviors. The idea is that children experience different sensory inputs, which engage different parts of their brain when they are in a safe environment (Chitsey, Haight, & Jones, 2002; Davies, 2012).

**Motivation of the study**

To offer appropriate music activities within the curriculum for children with Profound Intellectual and Multiple Disabilities (PIMD) is a challenge. The research team had been working with children with sensory issues for more than 7 years without seeing a state-of-the-art Multi-Sensory Environment (MSE) as the one the team now manages in Taiwan. It is hoped that it will become a model for parents, educators and caregivers nationwide. However, there has been limited research on the effects of MSEs and particularly in relation to the long term effects on children. Therefore, the motivation for the study was to build up more reliability and credibility through music activities in a multi-sensory room.

**The purpose of the study**

The general purpose of the study was to examine the effect of music activities in a multi-sensory room on developing positive emotions for a child with multiple disabilities. The specific purposes of the study were:
1. To evaluate the use of music activities in a multi-sensory environment on increasing positive emotions for a child with multiple disabilities.
2. To evaluate the effectiveness of music activities in a multi-sensory environment on engaging a child with multiple disabilities developments.

**Research questions**

According to the goals of the study, the research questions were:
1. Will the use of music activities in a multi-sensory environment be effective on increasing positive emotions for a child with multiple disabilities?
2. Will the use of music activities in a multi-sensory environment be helpful on engaging and advancing a child with multiple disabilities developments?

**Literature review**

According to the Individuals with Disabilities Act (2004), “Multiple Disabilities” is a disability category under IDEA. Children with multiple disabilities have two or more disabling conditions that affect learning or other important life functions.

The effects of music activities on children with disabilities are numerous. The
contributions of music therapy for children include: cognitive, social, language and physical development (Boxill & Chase, 2007; Schwartz, 2008; Wigram et al., 2002).

The effectiveness of music for children with disabilities

Recently there has been a steady research increase related to the impact of music on children with disabilities (Kern, Wakeford, & Aldridge, 2007; Whipple, 2004). Research studies proved that music allows the individual to vent emotions, to effectively enhance the ability to cope with stress, and to develop cognitive, linguistic, social and psychological treatments. Music provides a form of compensation for those with language impairments as well as a means of facilitating language development (Sze, 2004). One of the major contemporary applications for music therapy is working with children who have serious emotional disturbances and high degrees of impulsivity and limited ability to self-regulate (Layman et al., 2002). In special education settings serving persons with special needs, music therapists utilize music as an education related service to promote learning and skill acquisition (American Music Therapy Association, 2014).

The Effectiveness of Multi-Sensory Environments for Children with Disabilities

According to the American Association of Multi-Sensory Environments (2013), a multisensory environment is essentially a room that blocks out outside noises and lights so that the therapist or patients can control environmental factors such as lighting, noise, and other sensory input. They include controls that allow students, patients, participants to manipulate the environment on their own, but some environments are set up so that patients can simply enjoy them (AAMSE, 2013).

Multi-Sensory Environments

Multisensory environments (MSEs) have become popular in schools for students with severe disabilities in the UK, the US, and Australia, despite a lack of convincing research evidence for any positive effects on learning and behavior (Stephenson, & Carter, 2011).

A multisensory environment (MSE) is a room or space containing equipment that is designed to provide sensory stimulation to the users. Ideally, a MSE can stimulate or relax users with disabilities through the use of touch, sound, vibration, color and/or light (Fowler, 2008). Originally the concept of MSE was for users to freely explore and enjoy the experiences provided, and no specific purposes, no educational or therapeutic outcomes were intended (Hogg et al, 2001).
Multi-Sensory Environments for Children with Disabilities

A study by Pagliano (2008) provides an overview of the ideas regarding the use of Multisensory Environments (MSE) in education with children with profound multiple disabilities. It begins with the definition of the multisensory environment and highlights the range of different MSE types and applications. It is followed by an outline of how educators might work in teams to follow a four-stage, spiraling action research model consisting of (A) assessment, (B) planning, (C) action and observation, (D) reflection to (a) re-assess and (b) revise plan.

A survey was conducted in special schools enrolling children with severe disabilities in New South Wales, Australia. More than half of the 36 responding schools reported having a MSE installed. The results showed the wide range of uses and benefits that was a widespread acceptance of the inherent value of sensory stimulation (Carter & Stephenson, 2012).

Conclusion

An advantage of therapeutic music activities for children with multiple disabilities in a multi-sensory environment is that it is an inherently nonthreatening and inviting medium. It offers a child a safe environment from which to explore feelings, behaviors and issues ranging from self-esteem to severe emotional dysfunction.

Methodology

The methodology of the study was both quantitative analysis and qualitative reports. The quantitative analysis was based on assessment scales used in the pre-test and post-test by the participant’s head teacher and observation forms by two trained observers. The qualitative reports included interviews with parents, classroom teachers and anecdotal observation reports from two observers. All sessions were filmed on video and edited for the purpose of monitoring progress.

Participant and Setting

One participant was a three year-old boy with multiple disabilities, which include visual impairment, emotional disturbance, cognitive delay and language impairment. However, he was very sensitive to music and interested in responding to it spontaneously. He was enrolled in a regular private kindergarten in Taichung, Taiwan, and was selected by targeted sampling to participate in the study.
**Duration**

The duration of the study was a twelve week with fifty minute sessions once per week of specific, study-focused therapeutic music activities. Prior to the formal teaching, four observations were taken by the researcher and two observers to obtain the participant’s condition.

**Research Design**

According to Gaulin et al. (2003) emotion is associated with mood, temperament, personality, disposition, and motivation. Motivations direct and energize behavior, while emotions provide the affective component to motivation, positive or negative. Therefore, there were 2 main goals of the study. The goal of the first stage was to elicit the participant’s positive emotions using therapeutic music activities in a group setting. The goal of the second stage was to continue improving the participant’s positive emotions and enhancing his learning motivation and other areas of development in a multisensory room.

All observations of the participant undertaken during all sessions were recorded on videotape.

**The Curriculum Design**

The curriculum framework has been tested by the primary researcher’s hands-on teaching for 13 years. The curriculum contents and the goals are as follow:

- **Hello Song**: to develop children’s awareness of classroom rituals.
- **Attendance Song**: to develop children’s self-awareness, social interaction with peers and adults.
- **Singing and Musical Movement**: to develop the physical movement and musical intelligence.
- **Musical Storytelling**: to motivate children’s interest, stimulate visual and aural cognition and enhance children’s attention span.
- **Relaxation Time**: to have children relax from the activities.
- **Goodbye Song**: to develop awareness of class rituals.

**Data Analysis**

The results were interpreted based on data collected via a semi-structured musical activities observation form, interviews with teachers, musical activities feedback form, and researcher’s teaching log. Cross-comparison was conducted on the quantified data.
and related original documents to increase the objectivity and reliability of the research results.

**Assessment**

The instrumental assessment included the semi-structured observation forms to gather data on the development of emotional responses from two observers who were trained graduate students; interview reports from the teacher at the kindergarten; and teaching logs from the researcher.

In assessing the participant’s initial behavior, prior to the formal teaching, four observations were taken to obtain the participants’ condition. The baseline observations concluded when the observers were in agreement about the specific nature of the participant’s behavioral and developmental challenges.

All intervention sessions were recorded on video and these were viewed and scored by two observers. In the observation form of assessing the participant’s emotions, it was scored on a “1-5” (Likert) scale on a range of aspects related to emotion responses. For the assessment standard of emotion responses, a score of “1” indicated the participant had 100% negative responses, such as: screaming, crying and aggressive behaviors, such as: hitting, self-injury, biting or kicking etc. A score of “5” showed the participant had full positive responses throughout the therapeutic session, such as: showing their happiness by smiling or laughing.

**Results**

The results are summarized for the participant and are presented in Figure 1 and Figure 2. The comparison of pre-test and post-test is shown in figure 1. The participant was scored on a “1-5” scale on a range of aspects related to emotional status by the participant’s head teacher. For the criteria of emotional status, a score of “1” indicated the participant had totally, 100% negative emotions and behaviors, such as: disruptive behaviors all the time during the school hours. A score of “5” showed the participant had totally, 100% positive emotions or behaviors/responses, such as: smiling, laughing or able to be calm and attend the class.
Figure 1: Pre-test & Post-test of the participant's positive emotions.

Compared to the baseline, the results showed a positive effect for the participant after receiving music activities in the multisensory room for 12 sessions. Not only were the negative behaviors decreased, the participant’s learning motivation was increased throughout the intervention sessions.

Compared to the baseline, the results showed a positive development in the study group for the participant after receiving music activities in the multi-sensory room. Throughout the study period, even slowly, the results indicated the participant’s both positive emotions and learning motivation were increased under treatment. Ratings according to the observation forms showed positive changes in the participant.

The Changes of the Participant’s Emotion Status and Behaviors

The comparison of the participant’s emotional status and behaviors between the baseline at the beginning and the intervention at the end of the study are shown in Figure 2. The participant’s narrative is based on the observation forms, teaching log, and interviews.

Prior to the formal teaching, 4 observations were taken. The participant showed negative emotions during the session at school.
The Impact of Music Activities in a Multi-Sensory Room for Children with Multiple Disabilities on Developing Positive Emotions: A Case Study

<table>
<thead>
<tr>
<th>Participant’s emotional status</th>
<th>Baseline Session (beginning)</th>
<th>Intervention Session (the end)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of the participant</td>
<td>Negative emotions &amp; Behaviors</td>
<td>Positive emotions &amp; Behaviors</td>
</tr>
<tr>
<td>3 years old; Male; Diagnosis: multiple disabilities-- visual impairment, emotional disturbance, cognitive delay and language impairment</td>
<td>Crying, Clamoring, Squirming, Weepy</td>
<td>Would calm when hear the music</td>
</tr>
</tbody>
</table>

*Figure 2. The comparison of the participant’s emotion status and behaviors.*

The Intervention Session

At the beginning, the participant's emotions were negative most of the time. He often showed resistive behaviors to express his emotions. Sometimes, he would emerge crying, clamoring and squirming behavior. When the participant was invited to join the activities, he would show negative emotions obviously. However, when the participant would hear the music, he would stop negative behaviors and smile. Throughout the study, the participant was able to keep himself in a positive and stable emotional status and response. Therefore, the study had an explicit effectiveness for the participant’s positive emotions.

*Figure 3. The weekly changes of the participant’s emotional responses*
The following description indicates the changes of the participant's emotional responses based on the observation forms from two observers.

Week 1 to week 4
At the beginning, the participant’s emotions stayed in a very unstable stage. Most of the time his emotion status was negative and often he would use the resistant behavior to express his emotions. The participant occasionally appeared weeping, clamoring and squirming behavior, when inviting to join the activities.

Week 5 to week 8
The participant kept in a positive emotional stability for a longer time. At the 6th week, the participant could maintain a pleasant mood throughout the activities and transform time, both with smiling and clapping hands to express his happy mood. Through the 7th and 8th weeks, the participant was able to regulate his own emotions and maintain the positive emotions in participating in activities.

Week 9 to week 12
At this stage, the participant was able to maintain the positive emotions and his self-regulation of mood. He could maintain his stable and positive emotions by actively participating in the activities most of the time. Through the activities, he often expressed his pleasure moods with a smiling face and sometimes with clapping hands. In sum, he was also able to keep the stability during the teaching periods.

Week 13 to week 16
At the final stage of the study, the participant's emotional status and behaviors showed stably all the time. His emotions were mainly happy and positive. He was also able to make a good interaction with instructor and assistants even though he still interacted with peers in a passive condition. To compare with the beginning stage, the participant made a big difference of no exclusion for peers, and was able to interact with them in the class.

Curriculum analysis:
The hello song activity was always able to catch the participant’s attention for a short time at the beginning of the class. During the attendance song, the participant understood the call and response gradually by showing the proper responses. Singing and musical movement was the favorite activity for the participant. He would stop crying from hearing the music playing. At the final stage, he was able to enjoy dancing with peers by showing his smiling face. The participant liked the musical storytelling time. When the instruments played the character roles, he would go in front of the big
The Impact of Music Activities in a Multi-Sensory Room for Children with Multiple Disabilities on Developing Positive Emotions: A Case Study

storybook until the end of the story time. During the relaxation time, the participant started from anxious and crying status at the beginning session to calm at the end of the session. He would lie down before the relaxation music playing. Even the participant could not speak well, he would join the instructor to wave and kiss goodbye. Sometimes he would kiss goodbye to the target objectives that used in the class.

Conclusions, findings, recommendations and discussion

Conclusions

The results showed the effectiveness of music activities in the multi-sensory room on developing the participant's positive emotions skills. Throughout the study, the participant showed his capacity of development to keep growing. The most obvious change was the emotional expression. At the beginning of the study, his emotions were totally negative and he was not good at managing his self-regulation; therefore, indirectly affected his performance in school. By the end of the study, the participant's emotions were not only been forwarded stably, but also been pleasant. Based on the results, the conclusion suggests that music activities in the multi-sensory room may have a measurable effect on child development and provide a basic and supportive method for children with disabilities.

Findings

After the implementation of the study, there were some findings for the participant other than the research goals:

1. The attention span for the learning activities was gradually longer. Based on the observation forms and teaching logs, the participant’s love of music was a main key of drawing his attention on learning activities. During the teaching process, the participant would smile and clap hands to express his positive emotions. When he heard the music, his emotions would become steady and positive and his body would respond to rhythm spontaneously.

2. The communication skills were improved. At the beginning, the participant was not able to follow and understand the instructions. He needed the assistance to guide him all the time. By the end of the study, the participant was more familiar with the curriculum model and contents, so he could take the initiative for a response and achieve the instructions on his own. On the other hand, when the participant was unfamiliar with the instructions, he needed more assistance and guidance.
3. The physical movements were enhanced. At the beginning, the participant’s physical movements were still undeveloping and slow. After the completion of the study, his physical movements were more stable by participating in the musical activities more and more.

**Recommendations and Discussion**

According to the results, conclusions and findings, the study had an effective impact on the participant’s positive emotions and other areas of development. However, its inference is only for a single case and hard to extrapolate to other possible clients with variables such as: different types of disabilities, genders, ages etc. Therefore, the recommendations for the future studies include a longer length of data collection and more participants in order to obtain more valid and reliable results.

The questions that arose from this study include: Would the results widely apply to other special child care? Would the participant have sustained more of the positive emotional status if the study had been longer? Would the results will be same if use ready-made music and songs?

**References**


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