The Social and Cognitive Effects of Music Education on Special Needs Students

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Abstract

With the adoption of inclusion policies such as the Every Student Succeeds Act, it has become increasingly important for students to have equal access to a quality education in all subject areas. In the last five years, more students with special needs are becoming involved in music education programs within their schools. The purpose of this thesis is to examine how the involvement of special needs students in music education programs may provide these students with cognitive and social benefits that affect conditions surrounding their disabilities. The results of various research studies show that special needs students involved in Music Education, whether in an ensemble or private instrument study, have experienced advantages due to their musical studies. Music Education can provide special needs students with increased confidence and advanced social and cognitive skills.

The Social and Cognitive Effects of Music Education on Special Needs Students

The United States Census Bureau has found that about 56.7 million people–19 percent of the population -- have a either a physical or mental disability, and that number is steadily increasing with time.[1] There has been a corresponding increase of special needs students within the school systems of the United States. The National Center for Education Statistics reported that there are 7.0 million students, or 14 percent of all public-school students who receive services provided by special education.[2] After the adoption of policies such as the Every Student Succeeds Act, [3] it has become increasingly important for students to have equal access to a high-quality education in all subject areas. Educators often strive to include special needs students in all areas of education, including music. With this growth of special needs students, the number of these students involved in music education programs is rising as well. Many music educators do not have a full understanding of their students' disabilities and feel unequipped to present musical concepts to special needs students.[4] However, an understanding of Music Education's benefits for special needs students may encourage music educators to pursue a better understanding of their students' capabilities and to help create a learning environment in which these learners may be provided with accommodations to develop cognitive, social, and musical skills. The benefits of musical study for special needs students should be researched in order to

[1] "Nearly One in Five People Have a Disability in the U.S. Census Bureau Reports," United States Census Bureau, (July 2012): https://www.census.gov/newsroom/releases/archives/miscellaneous/cb12-134.html. Accessed March 7, 2021.

[2] "National Center for Education Statistics," Google, last modified May 2019, https://nces.ed.gov/programs/coe/indicator_cgg.asp.

[3] "The Every Student Succeeds Act (ESSA)," Google, accessed March 7, 2021, http://www.everystudentsucceedsact.org/.

[4] Christopher M. Johnson and Alice-Ann Darrow, "The Effect of Positive Models of Inclusion on Band Students' Attitudinal Statements regarding the Integration of Students with Disabilities," *Journal of Research in Music Education* 45, no. 2 (1997): 174, http://www.jstor.org/stable/3345578.

discover how the social and cognitive areas affected by their disabilities may be impacted by music education.

The Cognitive Benefits of Music Education

Involvement in musical ensembles or private lessons may provide every student with cognitive benefits. Studies have shown that special needs students in particular may experience cognitive development related to their diagnosed disabilities.[5] In recent years, special needs students who are involved in music education, whether in an ensemble or through private instrument study, have experienced improved cognition due to their musical studies.[6] The study of a musical instrument in private lessons may be associated with cognitive benefits for special needs students, including expanded reading and spelling skills, motor skills, and fluid intelligence.[7] Music educators should have a thorough awareness of the cognitive benefits of their programs in order to understand the importance of special needs students' involvement.

Motor Skills

Special needs students have been able to improve their motor skills from their involvement in music education programs. Physically disabled instrumental education students have been known to develop improved hand-eye coordination and enhanced concentration while completing intricate cognitive and motor assignments.[8] Evaluation of the level of motor

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[5] Dawn Rose, Alice Jones Bartoli, and Pamela Heaton, "Learning a Musical Instrument Can Benefit a Child with Special Educational Needs," *Psychomusicology* 28, no. 2 (2018): 78. http://ezproxy.liberty.edu/login?url=https://search.proquest.com/docview/2117330620?accountid=12085.

[6] Ibid., 71.

[7] Ibid., 78.

[8] David Nabb and Emily Balcetis, "Access to Music Education: Nebraska Band Directors' Experiences and Attitudes Regarding Students with Physical Disabilities," *Journal of Research in Music Education* 57, no. 4 (January 2010): 311, http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Faccess-music-education-nebraska-band-directors%2Fdocview%2F1094184%2Fse-2%3Faccountid%3D12085.

capabilities in correlation with Music Education reveals that rhythmic activities synchronized with movement are able to greatly increase motor performance.[9] Even though students are able to develop motor skills in Physical Education classes, a study done with preschool students in an integrated Music and PE program found that rhythmic activities involving throwing, catching, and leaping to music enhanced the students' motor abilities more than simply participating in movement exploration actions.[10]

Through examination of the music students' brain activities after one year of instrumental music training compared with the brain activity of non-musicians, there were significant differences revealing heightened motor abilities in musically trained individuals.[11] Since instrumental training is a multisensory motor experience and requires bimanual motor activity, it affects the makeup of the brain, and keyboard players in particular have notably more grey matter in the sensorimotor cortex.[12] In a study involving five- to seven-year-old children who participated in either piano or string lessons for fourteen months, each of the children had MR scans of the brain, as well as two motor tests to measure their speed in dexterity in the hands through index finger tapping and motor sequencing using four fingers. After the fourteen months, the MR scans showed a greater increase in gray matter in the instrumentalists' brains as

[9] Susan Hallam, "The Power of Music: Its Impact on the Intellectual, Social, and Personal Development of Children and Young People," *International Journal of Music Education* 28, no. 3 (August 2010): 280.

[10] Ibid.

[11] Gottfried Schlaug, Andrea Norton, Katie Overy, and Ellen Winner, "Effects of Music Training on the Child's Brain and Cognitive Development," *Annals of the New York Academy of Sciences* 1060 (December 2005): 219, http://ezproxy.liberty.edu/login?url=https://search.proquest.com/docview/70166674?accountid=12085.

[12] Ibid.

opposed to non-instrumentalists of the same age, and the instrumentalists scored significantly higher in the motor tests than the non-instrumentalists.[13]

In a study done by Dawn Rose, Alice Bartoli, and Pamela Heaton, an eight-year-old boy (who will be referred to as CB) with ADHD, Asperger syndrome, and a visual and auditory processing disorder was able to receive musical training and lessons on the tenor horn for one academic year in order to measure the impacts of his musical studies on his cognitive abilities. This study evaluated the student's motor abilities in the categories of Aiming, Catching, Manual Dexterity, and Balance. At the beginning of the study, CB displayed low motor abilities and had tutor comments regarding his difficulties with coordination and tonguing on the horn. However, after participating in the study and completing the post-tests to measure his motor capabilities, CB experienced an increase from the sixteenth to the fiftieth percentiles in the categories of Aiming, Catching, and Manual Dexterity, while his scores in the Balance category remained the same. In addition to motor abilities, CB was able to develop music-related motor skills required to play the tenor horn, including forming an embouchure, tonguing, and fingering. While there had been initial troubles in these areas, CB's horn tutor did not mention any continuing issues after the initial year of training, and according to the authors of the study, CB continues to play the tenor horn today.[14]

Reading and Spelling Abilities

Along with the development of motor abilities in special needs students, music education has assisted in the improvement of students' reading and spelling skills. One study evaluated the reading abilities of second grade students who studied the piano for three consecutive years in

[13] Schlaug, Norton, Overy, and Winner, 219.

[14] Rose, Bartoli, Heaton, 72-76.

relation to students of the same age who received no musical instruction. At the end of the study, the piano students had significantly higher vocabulary scores than the control group.[15] The reading abilities of children considered to be slow learners have also been studied, and a group of six- to eight-year-old students had their reading abilities tested before and after receiving musical instruction. The results displayed scores increasing from the seventy-second percentile to the eighty-eighth percentile, which was a more significant increase than the control group's scores.[16]

Rhythmic activities have also been shown to increase the reading abilities of students who have learning disabilities. In a study evaluating the effects of musical instruction of special needs students' reading levels, the students with special needs initially struggled with rhythm performance in relation to the performances of their grade-level peers. However, the special needs students experienced an increase in their reading comprehension skills through participating in a brief music education program. Throughout the six weeks of the study, the special needs students participated in weekly ten-minute music sessions that involved stomping, clapping, and chanting with a steady beat to music. Although these sessions only amounted to an hour of instruction, all of the students displayed enhanced comprehension skills by the end of the study.[17] Similar rhythmic training may also assist children with dyslexia in their reading and spelling abilities. While most students experiencing dyslexia have not shown difficulties in pitch recognition, they have displayed struggles in rhythmic skills. After rhythmic instruction, many children with dyslexia have experienced an increase in their phonological and spelling abilities.[18]

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[15] Susan Hallam, "The Power of Music: Its Impact on the Intellectual, Social, and Personal Development of Children and Young People," *International Journal of Music Education* 28, no. 3 (August 2010): 273.

[16] Ibid.

[17] Ibid.

[18] Hallam, 274.

Language Acquisition

Music education may help students with speech and language impairments improve their abilities. According to Susan Hallam's research on Music Education and child development, there is a suggested relationship between music and language, where musical training is a tool for enhancing the brain's coding of linguistic sound.[19] Nursery rhymes may be used to assist young children in developing phonological awareness, as these songs teach them to understand imitation through singing and speech. In one study, a group of kindergarten students who received four months of musical instruction, afterwards displayed an improvement in their phonetic abilities and were able to break words down into individual sounds at a better level than the students who had not received any musical training. This assumption is reinforced by Jessica Pitt, who she stated that the relationship between spoken word and music is undeniable, pointing to the results of a study in which stroke patients were able to "regain tonal and rhythmic aspects of speech with the use of musical approaches."[20] While the stroke patients in this study were adults, they exhibited similar issues to some special needs students, experiencing difficulty with their speech communication. When comparing the influence of music and other visual and performing arts on students' language skills, music has still shown an exponentially greater impact on students' ability to identify speech segments than that of other arts, such as painting. According to Pitt, this is most likely due to that fact that Music Education includes activities that "promote auditory perception, phonological memory, and meta-cognitive knowledge, all three of which are important to the development of linguistic skills."[21]

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[19] Hallam, 271.

[20] Jessica Pitt, "Communicating through Musical Play: Combining Speech and Language Therapy Practices with Those of Early Childhood Music Education – The SALTMusic Approach," *Music Education Research* 22. no.1 (2020): 71, doi:10.1080/14613808.2019.1703927.

[21] Pitt, 21.

Researchers Audrey Don, Glenn Schellenberg, and Byron Rourke investigated music's impact on students that have been diagnosed with Williams Syndrome, a genetic disease which greatly affects learning abilities. Throughout this study, the authors focused on discovering a correlation between the students' musical abilities and language functioning, as children with Williams Syndrome often display heightened verbal abilities and interest in music when compared to children with other types of special needs. All of the students in this study reported having a positive interest in music and scored with superior performance on musical and verbal tasks as opposed to all of the nonverbal abilities measured. In addition, the students displayed reasonably high receptive vocabulary that was equal to their skills in music activities. The students with Williams Syndrome also displayed the ability to synthesize sound patterns, using phonological skills to say unfamiliar words, which was not observed in any of the children in the control group. Music and language appeared to have correlated high scores, as the children displayed music and language abilities at the same level, while in comparison to other subjects such as visual abilities, the scores were much lower.[22]

While students who are deaf may not often be involved in musical activities, music education has improved cognitive and language skills in deaf students. Music training may be used to increase residual hearing in deaf children, as the sounds may stimulate the brain and help these students to imitate qualities of speech more effectively. In a study evaluating the effects of Music Education on deaf students, Núria Silvestre and Jesús Valero observed thirty-three deaf students over four years, with five of the students enrolled in music training classes. All thirty-three of the students were assessed on their linguistic and hearing skills through evaluations

[22] Audrey J. Don, Glenn E. Schellenberg, and Byron P. Rourke, "Music and Language Skills of Children with Williams Syndrome," *Child Neuropsychology* 5, no. 3 (1999): 157; 165-166, doi:10.1076/chin.5.3.154.7337.

before and after the study. The students attended weekly music classes for four consecutive academic years, where they were taught in areas including song, voice, rhythm training, improvisation, and ear training. After the four years of musical training, all of the deaf students study displayed significantly improved language abilities. The students were first evaluated on their ability to construct sentences, and while at the beginning of the study only two students spoke a two-word phrase each, at the end of the study all thirty-three students were able to speak in simple sentences with more than two words. However, the five students from the experiment group displayed greater ability to express themselves through sentences, while those from the control group would often revert to two-word phrases. In the category of functional hearing, the students also showed improvement, and they also displayed an improved quality of voice with much more tonal stability than they had prior their musical training.[23]

Academic Development

In addition to the skills in verbal and general cognitive functioning, music training may have an impact on students' mathematical skills, verbal skills, and visual-spatial performance.[24] According to Susan Hallam, there is a close connection between music and mathematics, as musicians must use quasi-mathematical processes to interpret rhythmic notation.[25] A 2001 study by J.A. Haley evaluated the effects of music training on students' mathematics scores and displayed a positive relationship between music and math. This study focused on children who learned a musical instrument before fourth grade and found that they had much higher scores in

[23] Nuria Silvestre and Jesus Valero, "Oral Acquisition by Deaf Pupils in Primary Education: Impact of Musical Education," *European Journal of Special Needs Education* 20 no.2 (February 2007): 196-197; 208-210, doi:10.1080/08856250500055719.

[24] Schlaug, Norton, Overy, 219.

[25] Hallam, 274.

mathematics than their peers not involved in Music Education.[26] A study by J. Catterall, R. Chapleau, and J. Iwanga also showed evidence in favor of Music Education's impact on students' mathematical abilities. The study involved twelfth-grade students who exhibited increased mathematics skills and found that thirty-three percent of the students were participants in the instrumental program, as opposed to the fifteen percent of the students that were not musically involved.[27] According to Judith A. Jellison, a music educator and music therapist of thirty-two years, stated that a correlation exists between playing an instrument and higher scores on the SAT in both the mathematics and reading categories.[28]

The Use of Technology Platforms in Music Education

Studies have also shown that Music Education may increase the reasoning and memory capabilities of students with special needs. This improvement may come through an increasingly popular form of instruction for special needs students: Information and Communications Technology (ICT)-based music education programs. By participating in ten music education sessions on a multimedia tool called PLAtform for the Integration of Handicapped Children in Music Education (PLAIME), special needs students were able to interact with a highly versatile and personalized software that introduced them to the history of the recorder, finger positioning techniques, and reading and writing musical scores.[29] The multimedia program was specifically

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[26] Hallam, 274.

[27] Ibid.

[28] Julia Gallegos, "Judith A. Jellison: Music and Children with Special Needs," *Intervention in School and Clinic* 42, no. 1 (September 2006): 47, http://ezproxy.liberty.edu/login?url=https://search.proquest.com/docview/211761057?accountid=12085.

[29] Maria-Dolores Cano and Ramon Sanchez-Iborra, “On the Use of a Multimedia Platform for Music Education with Handicapped Children: A Case Study,” *Computers & Education* 87, no. 23 (July 2015): 257, doi:10.1016/j.compedu.2015.07.010.

designed for ease of use by students with disabilities, featuring a tactile screen that allowed students to come to a foundational understanding of how to hold the recorder for proper playing technique. After completing the instruction modules, all of the students displayed enhanced reasoning and memory capacities. Each student was able to recite the ascending scale by memory and position all of the notes on the staff.[30]

ICT music education programs have also helped students who have been diagnosed with Auditory Processing Disorders (ADP). Research by Georgia N. Nikolaidou, et al. evaluated the impact of ICT approaches on one hundred nine- to-twelve-year-old students diagnosed with ADP. The ICT programs featured computer-based lessons, music performing software, as well as computer music games that built students' comprehension of rhythm, melody, and lyrics.[31] While the results of this study varied due to the wide range in the ages of the students, the authors still concluded that ICT music education programs could be used to assist students with disabilities and provide them with a customized and accessible format for acquiring a higher understanding of musical concepts.[32] ICT-based program studies have also evaluated the influence these programs may have on students' musical competencies, and results have consistently found that students enrolled in ICT music education programs have been able to develop significantly higher levels of musical competence, expression, and use of musical language.[33]

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[30] Cano and Sanchez-Iborra, 271.

[31] G.N., Nikolaidou, V.T. Iliadou, S.G. Kaprinis, L.J. Hadjileontiadis, and G.S. Kaprinis, "Primary School Music Education and the Effect of Auditory Processing Disorders: Pedagogical/ICT-Based Implications," *Eighth IEEE International Conference on Advanced Learning Technologies* (July 2008): 1030, doi: 10.1109/ICALT.2008.46.

[32] Ibid., 1031.

[33] Juan R. Hernández-Bravo, Cristina M. Cardona-Moltó, and José A. Hernández-Bravo. "The Effects of an Individualized ICT-based Music Education Programme on Primary School Students' Musical Competence and Grades," *Music Education Research* 18, no. 2 (2016): 186, doi:10.1080/14613808.2015.1049255.

Researchers have also explored the benefit of music composition software and its use by special needs students. In a study by Adam Patrick Bell, he worked closely with an adolescent with Down Syndrome ("Tim") throughout the student's composition process. The author served as a facilitator between Tim and the music making process in order to better understand how the software impacted Tim's composition abilities and thinking process. Tim used the technology to write and record his own songs, which he was able to accomplish with much success, recording six original songs in one session.[34] While composition technology has become a popular way for young composers to create their original music, this may also be a beneficial tool for special needs students, as it is a format that allows anyone to create music without the pressure of only one correct way of creating music.[35]

The Social Benefits of Music Education

In addition to the cognitive benefits of Music Education, special needs students may also develop a higher level of social abilities from involvement in musical activities. Through connections with peers in music ensembles and the relationships formed with their ensemble directors, Music Education provides these students with numerous opportunities for social interaction. In these collaborations with others, students with special needs may further develop social skills that may be impacted by their disabilities.

Relational Development

Participation in choral, band, and orchestral ensembles, as well as ethnic ensembles such as jazz band or percussion groups, may provide social interactions that promote social skills in

[34] Adam Patrick Bell, "The Heart of the Matter: Composing Music with an Adolescent with Special Needs," *International Journal of Education & the Arts* 9, no. 9 (June 2008): 15, http://ezproxy.liberty.edu/login?url=https://search.proquest.com/docview/304970322?accountid=12085.

[35] Ibid., 5.

special needs students. While the process of learning music within these types of ensembles may not provide the social skills, interactions among the students before and after the class provide opportunities to develop social skills, and music educators can purposefully structure their classroom environments for social interactions.[36] The success of musical ensembles is often built on trust and respect in the relationships among ensemble members; the smaller the group, the closer members often become in their experience.[37] Students with disabilities may often feel as though they do not have a place where they belong. By including special needs students in musical ensembles, these students may have a better opportunity to form relationships with their peers in a manner that develops trust and reciprocity, because community music making unites individuals.[38]

In addition to the ensemble context, special needs students may develop relational skills in general music classes, as well as in private instrumental or voice lessons. With the use of ICT platforms, students may have the opportunity to collaborate with their peers in playing musical games or solving problems, increasing their interpersonal skills and the application of teamwork in social settings.[39] Even in the context of private lessons, students with special needs may gain enhanced relational skills through classes with students receiving lessons from the same instructor. In a study done with a vocal studio containing both students without disabilities and students with Asperger's Syndrome, the students with Asperger's developed their relational skills

[36] Gallegos, 47.

[37] Hallam, 279.

[38] Adam M. Croom, "Music Practice and Participation for Psychological Well-Being: A Review of How Music Influences Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment," *Musicae Scientiae* 19, no. 1 (March 2015): 52, doi:10.1177/1029864914561709.

[39] Cano and Sanchez-Iborra, 271.

due to their interactions with students who displayed more appropriate social behavior.[40] Ann Cravero, a renowned vocalist and music educator, found that students with special needs often benefit relationally from having a peer buddy within the vocal studio. Most students with special needs desire friendships with their peers but often find themselves feeling abnormal or out of place due to their disabilities. However, when the teacher selects another student who is mature and openminded to initiate conversations with a special needs student, the student with special needs may feel more welcomed, confident, and encouraged to engage with other students.[41]

Communication Skills

Special needs music students have been able to develop a higher level of communication skills than those with the same disabilities who have not received any musical instruction. Since Music Education requires students to work together in a unified manner, it is an activity in which students gain skills in group communication and collaboration for successful performances.[42] When playing an instrument, students with special needs are able to display a level of expression and communication that they are often unable to achieve due to their disabilities and limitations.[43] A study involving student music groups centered around speech and language development included a survey for parents to complete at the end of the course, with 90% of parents stating that their child's communication skills had increased due to music classes. One set

[40] Ann Cravero, "Exceptional Students in the Voice Studio: Understanding and Training Students with Asperger's Syndrome," *Journal of Singing* 77, no. 2 (November 2020): 170, http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fexceptional-students-voice-studio-understanding%2Fdocview%2F2462456335%2Fse-2%3Faccountid%3D12085.

[41] Ibid.

[42] Nikki S. Rickard, Peter Appelman, Richard James, Fintan Murphy, Anneliese Gill, and Caroline Bambrick, “Orchestrating Life Skills: The Effect of Increased School-Based Music Classes on Children’s Social Competence and Self-Esteem,” *International journal of Music Education* 31, no. 3 (August 2013): 294.

[43] Nabb and Balcetis, 311.

of parents testified about their daughter's overwhelming success in the program, as she progressed from being mostly silent and having a vocabulary of five words to engaging with her parents and peers with a large vocabulary of over fifty words.[44]

In a 2008 study by Emily Finnigan that utilized musical intervention with autistic students, the students were able to develop increased levels of social responsiveness after completing music sessions. During these sessions, the students' communication skills were observed in the categories of eye contact, imitation, and turn-taking. When using alternating music and non-music sessions, the students displayed eye contact in five out of six music sessions, while there were zero instances of eye contact when music was not involved. As with the levels of eye contact observed during the music sessions, the students exhibited correct responses of imitation ranged from percentages of 36.7% with a steady increase to 100%, as opposed to an increase from 8.3% to 55.3% in the non-music context. The students were also able to drastically improve their communication in turn-taking with others and came to be able to retain 100% success in proper turn-taking throughout the last three sessions, while the non-music sessions only succeeded in raising the percentage to 53.3%.[45]

Students with special needs may also benefit communicatively in musical play and music education environments, especially because a high level of verbal communication skills may not be expected from them. Within music, these students do not have to communicate through words, as the use of words may cause these students anxiety or feelings of pressure and blame, due to their lack in communicative abilities. According to Jessica Pitt, students learn to explore

[44] Pitt, 78.

[45] Emily Finnigan, "Increasing Social Responsiveness in a Child with Autism: A Comparison of Music and Non-Music Interventions," PhD diss., University of Windsor, Canada, 2008, ProQuest Dissertations & Theses Global, 44-47.

their abilities of social interaction and expression in the form of music to their teachers, peers, and parents as they interact in a sound-rich, talk poor environment of a music classroom.[46]

In Finland, the Resonaari Centre for Music Education offers music education services to students with special needs for both their enjoyment and the development of their social skills through interactions provided through musical activities.[47] The Resonaari Centre provides its students the opportunity to put on a concert each year, performing popular songs along with some of the students' original compositions. It was found that the music education program at Resonaari enabled students to develop high levels of communication skills. Students displayed high-functioning abilities in interaction between the audience and between other performers. The music educators allowed their students freedom and responsibility, and the students benefitted from and enjoyed the experience, with one student stating, "Performing is so great. I want to perform there [at the concert] again."[48] The Resonaari Center also included guests artists without disabilities to perform alongside the special needs students, and many parents testified that they believed this provided their children with an increase in their social and performance skills.[49] According to Sanna Kivijärvi and Ari Poutiainen, "Our research suggests that music-making and music education can enable sharing and learning: music and music-making can work as an instrument and channel through which social capital could be developed, expressed, and established."[50]

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[46] Pitt, 71.

[47] Sanna Kivijärvi and Ari Poutiainen, "Supplying Social Capital through Music Education: A Study on Interaction in Special Educational Needs Students' Concerts," *Research Studies in Music Education* 42, no.3 (June 2019): 356, doi:10.1177/1321103X19843005.

[48] Ibid.

[49] Ibid.

[50] Kivijärvi and Poutiainen, 348.

Emotional and Behavioral Development

Musical interventions with autistic students have been shown to have a positive impact on their social skills. When autistic children learn how to sing and play instruments to manage their symptoms, they have displayed reduced temper tantrums and anxiety, adjusted behavior patterns, and increased communication skills. These effects, compared to the impact of non-musical interventions for autistic students, have shown that the social and behavioral effects are more prominent in the students who have used the musical training as their intervention.[51] Students have also shown increased levels of interest in activities, elevated happiness, and consistently good behavior due to the implementation of musical activities as a part of their education or treatment for their special needs.[52]

Active musical activities, such as rhythmic training with drums, may be a beneficial tool to help students with special needs with their behavioral issues. Through such activities, students with disabilities are able to release energy that is often bottled up, allowing them to lessen aggressive behaviors and work together for the good of their groups.[53] Music listening activities may also assist in resolving special needs students' emotional and behavioral issues, as was shown in a study by Daniel Montello and Philip Coons. Students participated in a 12-week group course featuring music listening activities. The students developed social cohesion with their

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[51] Finnigan, 57.

[52] Ibid., 51-53.

[53] Daniel R. Montello and Philip Coons, "Effects of Active Versus Passive Group Music Therapy on Preadolescents with Emotional, Learning, and Behavioral Disorders," *Journal of Music Therapy* 35, no. 1 (1999): 64, http://ezproxy.liberty.edu/login?url=https://search.proquest.com/docview/1859309972?accountid=12085.

peers and became more willing to share their feelings with the group, softening those students who were initially defiant.[54]

The inclusion of special needs students in Music Education has also helped students develop on-task behavior in the classroom. According to another study by Louise Montello and Edgar E. Coons, teachers have increased the attentiveness of their students and limit off-task tendencies by maximizing the amount of time involved in music-making activities. When nine special needs students were observed within inclusive third and fourth grade music classrooms, they displayed the most on-task behavior during the times they were involved in interactive music-making activities. The authors of this study stated that outside observers of the classrooms would not have been able to notice any differences between the behaviors of the special needs students and their typical peers, as they were all participating in and appreciating the music making opportunities offered in the music classroom.[55]

The Importance of Providing Music Education as an Opportunity for Special Needs Students

With evidence of both the social and cognitive benefits of music education, it is important to include special needs students in music education programs. Although inclusion is a concept that is becoming more common in music classrooms, further efforts should be made to ensure students with special needs are able to receive a music education. Social and cognitive effects are not the only benefits that may be received from involvement in Music Education, but

[54] Montello and Coons, 61.

[55] Ellary A. Draper, "Observations of Children with Disabilities in Four Elementary Music Classrooms," *Applications of Research in Music Education* 36, no. 1 (October 2017): 18, doi:10.1177/8755123316660594.

students who have disabilities may also acquire a sense of identity and inclusion with other students in the same age group that is often difficult to promote in other environments.

Personal Development

Music Education may provide special needs students with a heightened level of confidence and self-esteem and help them feel that they have an individual identity that impacts the world around them. Music involvement may also become a way in which special needs students feel accepted, bringing them more confidence. This sense of accomplishment may stem from musical goals, as research has found that the pursuit of goals may instill a positive psychological state in students, improving their overall personal well-being.[56] While students with special needs may feel intimidated by competitive environments such as sports teams, involvement in Music Education may provide students with the ability to experience achievement in a non-competitive situation, resulting in feelings of success, pride, and increased self-esteem.[57]

Research has found that increased time in the music classroom has had a positive impact of students' academic skills. Students' academic abilities have remained consistent, while aspects of their personal development have increased.[58] Students have displayed greater independence and better attitudes, and when asked how they felt about having more time in music classes, the testified that they enjoyed the therapeutic impact of music. The students stated that it helped them feel more confident to perform in front of peers, and it also helped them learn how to express themselves. The students who were involved specifically in instrumental ensembles

[56] Croom, 56.

[57] Ibid., 57.

[58] Hallam, 278.

often mentioned an increase in their self-esteem and a greater sense of identity due to their participation in the music program.[59]

Recommendations for Parental Involvement

Students with special needs may be greatly impacted in their social, cognitive, and musical skills through the involvement of their parents in their music education. Parents of special needs students should seek opportunities for their child to become involved in music, whether in the setting of music education or by bringing music into the home. As with all subjects, parents are vital for the academic success of students with special needs. Research done by Susan Hallam on the impact of parents of six- to-ten-year-old special needs students in instrumental programs revealed that parental involvement correlated positively with the children's progress in the music program.[60] Parental involvement may also assist music educators in helping them to better understand their students with disabilities and come to know the most inclusive and effective manners in which they may teach them.[61]

In addition to musical success, the inclusion of music in the lives of special needs students may lead to more independence and accomplishments, which brings joy to their parents.[62] It has been found that the involvement of parents in their special needs child's music education motivates students to continue in their study of music as they feel the support of their parents toward their participation in a musical ensemble or private lessons. Through parents speaking to teachers after lessons, classes, or at parent-teacher conferences, students may

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[59] Hallam, 279.

[60] Vimari Colón-León, "A Model of Parental Involvement in the Music Education of Students with Special Education Needs," PhD diss., University of Miami, Coral Gables, 2018, ProQuest Dissertations and Theses Global, 26.

[61] Ibid., 30

[62] Gallegos, 49.

develop higher levels of intrinsic motivation, leading to the child's ability to practice and maintain their musical studies independently. Even if parents do not have musical skills themselves, they may purchase a keyboard or provide access to playlists, recordings, or musical apps for their child to become more exposed to music at home. When parents hear how their child may become independent in listening and playing music, they often want to pursue musical opportunities, as they allow their child to participate in activities with their peers.[63]

Inclusion of Special Needs Students

It is important to include special needs students within the music programs in schools. These students should not be denied the opportunity to participate in academic programs, and music educators should be prepared to develop a learning environment that will support these students' needs and encourage positive relationships among all students.[64] While some teachers or students may feel unequipped to teach or interact with individuals who have special needs, there are several benefits for both teachers and other students involved that may come from including special needs students in their classrooms.

Benefits for Teachers

With the assistance and advice of special education teachers, music teachers may feel more prepared to include these students and experience the benefits that come from incorporating them into ensembles and lessons. Special education teachers may be an effective resource, as they may be able to offer suggestions for adaptions and can explain the students' disabilities to the music teacher.[65] In 2004, an Illinois high school included a group of special

[63] Gallegos, 49.

[64] Johnson and Darrow, 174.

[65] Kimberly McCord and Margaret Fitzgerald, "Children with Disabilities Playing Musical Instruments," *Music Educators Journal* 92, no. 4 (March 2006): 51.

education students as the percussion section of their concert band. During each rehearsal, the special education teacher came to assist those students by encouraging them when changing instruments and reminding them to keep quiet while waiting for their entrances. The special education teacher was also able to greatly support the band director by communicating suggestions for adaptions, teaching strategies, and behavior management.[66]

Music educators may also develop higher levels of creativity in their own lives, as they learn to adapt to the needs of their students with special needs. One string teacher, Mike Govert, experienced this when he began teaching violin to a third-grader with Down Syndrome. While the student did not have any issues in posture or holding the instrument, she experienced difficulty in reading sheet music. Govert had to expand his own creativity in order to equip his student for successful musical performance. Govert developed his own musical notation system with color-coded note heads, and He staggered the notes on the page according to their pitch, larger note heads denoting longer values.[67] Through this system, Govert's student was able to succeed, and Govert reflects on teaching this student as the most rewarding experience of his teaching career.[68] This notation system prepared him for future teaching experiences with special needs students. This system could also be a beneficial resource with other music educators when working with students with Down syndrome.

Benefits for Students

While many students may feel uncomfortable with participating in musical ensembles with students who have special needs, research has shown that there are several benefits for the

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[66] Christine Lapka, "Students with Disabilities in a High School Band: 'We Can Do It!'" *Music Educators Journal* 92, no. 4 (2006): 54, http://www.jstor.org/stable/3401113.

[67] McCord and Fitzgerald, 51.

[68] Ibid., 52.

other students. In a high school band with a percussion section made up of students with severe disabilities, the other students in the band proclaimed their support for the special needs students in the ensemble, stating that they believed these students had improved their overall performance and were consistently trustworthy musicians.[69] The students with disabilities were also commended by their peers for their focus and responsibility, and one student stated: "When you are forced to spend time with someone, you learn to understand the person."[70]

Texas music educators have surveyed the influence of special needs students in music education, and 85% denoted that there was an equal level of benefits for students with and without disabilities when special needs students were included in the ensembles. One of the greatest benefits of having students with disabilities participate in musical activities alongside their peers is the improvement of attitudes toward students with disabilities, decreasing any judgment or misconceptions about these students.[71] Thirty-two studies on this topic were completed between 1975 to 2005, and each concluded that the interactions between students with and without disabilities in the music classroom positively influenced all involved and lowered feelings of judgment toward special needs students.[72] The inclusion of special needs students within the music classroom provides a significant level of benefits for all involved.

[69] Lapka, 58.

[70] Ibid.

[71] Nabb and Balcetis, 312.

[72] Ibid.

Recommendations for the Future of Special Needs Students' Music Education

As evidenced by the research presented on the benefits of Music Education for students with special needs, it is the responsibility of music educators and school board to ensure this opportunity for special needs students is available. Whether through private lessons or through participation in an instrumental or ensemble, Music Education for students with special needs should be one of the highest priorities for both music education and special education. As technology and educational techniques progress, the area of music education may also be improved to meet the needs of students with disabilities and offer increased opportunity for these students' involvement.

One of the most impactful ways that music educators can invest in their special needs students is through the purchase of adapted instruments. As more students with disabilities participate in Music Education, a variety of adapted instruments have been developed for ease of use, especially for individuals with physical disabilities. Students who desire to play percussion instruments may benefit from simple solutions, such as Velcro straps attached to drumsticks or mallets to secure them to the students' wrists, or lap pads for larger brass instruments and larger picks for guitar.[73] Saxophones have been adapted for one-handed players, with the use of electronic solenoids to press the keys normally played by the missing hand, and one-handed flutes have been developed for use by individuals with missing hands/arms or paralysis due to brain injury.[74] In recent years, electronic and digital instruments, such as keyboards or digitalized

[73] Patrick M. Bennnington, "Still Making Music: How Students with Traumatic Brain Injury Can Continue with Musical Activities," *Music Educators Journal* 103, no. 4 (June 2017): 23, doi:10.1177/0027432117697003.

[74] Nabb and Balcetis, 315.

woodwind instruments, allow students with special needs the ability to play music in a comfortable manner.[75]

In addition to the ICT-based programs for Music Education, the most recent developments in music education and technology are the use of hackathons, or "events in which participants work intensely in small groups at a centralize location for a short amount of time to develop a project from concept to prototype." [76] One of the purposes of hackathons is to develop resources and software for students with special needs to utilize in music classrooms. During a hackathon in 2018, a group of students created a technological music notation system to assist students with special needs in music reading. The first, known as the SCND Method, labelled with this acronym to represent the developers' names, Serena, Claudia, Nicole, and Denise, used bright colors and shapes to categorize pitches.[77] The students also developed a website in which music educators could input standard musical notation where it was translated to the SCND Method for ease of reading.[78] Through further use of hackathons and the improvement of technologies, similar resources may be developed in order to assist students with special needs within the music classroom. Music educators should be made aware of such resources and actively seek to gain information surrounding these possibilities, as adaptive instruments may be the deciding factor for a student with disabilities to participate in a music program.

[75] Bennington, 23.

[76] Adam Patrick Bell, David Bonin, Helen Pethrick, Amanda Antwi-Nsiah, and Brent Matterson, "Hacking, Disability, and Music Education," *International Journal of Music Education* 38, no. 4 (November 2020): 658, https://doi.org/10.1177/0255761420930428.

[77] Ibid., 663.

[78] Ibid., 664.

Conclusion

Through Music Education, special needs students are able to gain both social and cognitive benefits in a variety of ways. Research has shown these students may gain verbal, information, and mathematical skills, as well as improved motor and auditory functioning as they participate in Music Education. Socially, special needs students are able to interact with other students in choir, band, and orchestra ensembles, increasing their communication skills and general social skills, and music as an intervention with autistic students may alter repetitive behavior patterns and increase their verbal and nonverbal communication abilities. Both teachers and principals, as well as the parents of special needs students, should come to recognize the importance of Music Education and incorporate it as a part of their students' lives. The application of Music Education in the lives of special needs students can provide them with a new sense of acceptance and growth in knowledge as music brings these students new and advanced social and cognitive skills and abilities.

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