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AUTHOR	Yoon, Jenny Nam
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ABSTRACT

A growing body of research reveals the beneficial effects of music on education performance. Research indicates that music plays an important role in the brain development of a child. Furthermore, researchers believe that children who have more exposure to music and music training benefit from enhanced brain activity which has been shown to increase students' abilities to perform certain academic tasks. In addition, many practical life skills are acquired through music learning and music training. Music education is believed to deserve the status as an equally significant core subject. A review of the literature demonstrates the benefits of music education, discussing the influence of music on the child's brain development, academic performance, and practical life skills. (Contains 38 references.) (Author/BT)

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MUSIC IN THE CLASSROOM: ITS INFLUENCE ON CHILDREN'S BRAIN DEVELOPMENT, ACADEMIC PERFORMANCE, AND PRACTICAL LIFE SKILLS

A Thesis

Presented to

the Faculty of the Department of Education

Biola University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

By

Jenny Nam Yoon

Spring 2000

SO 031 828

Jenny Nam Yoon

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Approved by:

Department Chair: _____ Date: 5/4/00

Capstone Chair: June Hetzel, Ph.D. Date: 5/4/00

Second Reader: _____ Date: 5/4/00

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ABSTRACT

MUSIC IN THE CLASSROOM: ITS INFLUENCE ON CHILDREN'S BRAIN DEVELOPMENT, ACADEMIC PERFORMANCE, AND PRACTICAL LIFE SKILLS

Jenny Nam Yoon

A growing body of research reveals the beneficial effects of music on education. Research indicates that music plays an important role in the brain development of a child. Furthermore, researchers believe that children, who have more exposure to music and music training, benefit from enhanced brain activity, which has been shown to increase students' abilities to perform on certain academic tasks. In addition, many practical life skills are acquired through music learning and music training. Therefore, music education is believed to deserve the status as an equally significant core subject. A review of the literature demonstrates the benefits of music education, discussing the influence of music on the child's brain development, academic performance, and practical life skills.

Introduction

A tragedy is occurring in the education system where budget cuts are eliminating many art programs with the emphasis on "getting back to the basics." With political pressures emphasizing higher standardized test scores, a school's function becomes more the preparing of students for the "test" instead of producing a well-educated child. Riley states, "Tight budgets, overcrowded buildings and a renewed emphasis on core subjects have all conspired to limit the amount of music education in our nation's schools" (1999, p.4). Renee Williams of the National School Boards Association states, "When school districts are strapped for funds, the programs that seem to get cut first before athletics or anything else are the arts programs" (Cited in Riley, 1999, p.5). Thus, teachers often go against their personal convictions and passions for a liberal arts curriculum by responding to pressures and expectations from school and district administrators who often espouse the importance of reading, writing and arithmetic.

The irony is that a growing body of research shows that teaching music and other art curriculum enhances and contributes to student's cognitive performance on standardized tests, such as in reading and math. In addition, the study of fine arts curriculum enhances motivation and discipline, which are intrinsic ingredients necessary to succeed in the academic arena. Furthermore, Riley states, "Just as we're tuning out choirs and orchestras, some new studies suggest that music is a valuable learning tool" (1999, p.4). Williams confirms, "Some people just don't see the importance of it [fine arts], that there has been recent research done on how these types of curriculums in music and art can help with brain development" (Cited in Riley, 1999, p.5). Thus, this review

of literature shows music's powerful influence on students' brain development, academic performance, and practical life skills.

Review of the Literature

Music's Influence in Brain Development

Music is generally perceived and viewed as an enjoyable, pleasurable, and aesthetic experience. Music is often used consciously or unconsciously as a vehicle to help create a certain feeling or mood within the listener. Life would be very humdrum without music's existence, because music is a natural part of people's lives and influences their thoughts, feelings, and ways of interacting with themselves and others. Yet, the added power of music to develop one's brain and enhance learning is often overlooked.

Historically, music has been used as a tool for learning. Music has always helped people tell and remember stories. Early man sitting around campfires told tales of great battles accompanied by drumbeats. Bards sang about national heroes during the Middle Ages, informing their countrymen of the latest news. Today, music is used to help facilitate one's gaining knowledge of self, others, and the world (Davies, 2000). The power of music exceeds mere pleasure for it has strong biological roots, helps the brain to grow and integrate the two hemispheres, and plays a crucial role in the neurological development of the child.

Biological Roots

Scientific literature suggests that music is part of one's biological heritage. Certain findings and observations confirm this scientific hypothesis. First of all, animals have fundamental abilities in music. For example, monkeys can think in terms of musical abstractions, such as the fundamental frequency of a harmonic series. Secondly, musical

behaviors are universal. Music is prevalent in various cultures. Parents and caregivers across cultures communicate with infants through lullabies and musical baby talk (Weinberger, 1998).

There are additional observations confirming the biological roots of music. Musical behaviors are often revealed early in life, before cultural factors influence and change behavior. Recent studies indicate that infants have musical capabilities. For example, they can discriminate between two notes, remember the contour or pitches of melodies, mentally segment or "chunk" extended melodies into smaller phrases, as adults do, and comprehend rhythm (Weinberger, 2000).

Thus, the brains of children are well equipped to understand music. If parents and caregivers would reinforce children's spontaneous musical activities, then they would enhance children's natural development of communication, expression, and cognition (Weinberger, 2000).

Brain Growth and Integration

The brain is divided into two halves: the analytical brain and the subjective-artistic brain. When both halves of the brain are stimulated unequally, the brain cannot develop as a whole. Therefore, one's potential intelligence remains underdeveloped. Thus, it is theorized that the artistic child optimizes the brain's bilateralism, which increases his intelligence (Lehr, 1998).

Frank Wilson, a well-known neurologist, stated that scan studies indicate that music more fully involves brain functions in both hemispheres than any other activity the researcher studied. He also stated that research indicates that intelligence is increased

when a child learns to play a musical instrument. Approximately 80 to 90 percent of the brain's motor control capabilities regulate stimuli to and from the hands, mouth, and throat. Wilson believes that by developing highly refined control in those areas during childhood almost stimulates the entire brain. Therefore, the brain's total capabilities are increased (Lenr, 1998).

Researchers indicate that the left hemisphere analyzes the structure of music, while the right hemisphere focuses on the melody; thus music synchronizes the right and left hemispheres of the brain. "The hemispheres of the brain work together when emotions are stimulated, attention focused, and motivation heightened. Rhythm acts as a hook for capturing attention and stimulating interest. Once a person is motivated and actively involved, learning is optimized" (Davies, 2000, p.148).

Electroencephalogram tests reveal that music changes brain waves, making the brain more conducive to learning. Don Campbell, Director of the Institute for Music, Health, and Education, explains that music "rhythmically and harmonically stimulates essential patterns of brain growth" (cited in Davies, 2000, p. 148).

Neurological Development

Scientists, medical researchers, psychologists, and educators consider various subjects to try to connect how music and the brain are interrelated. They try to solve questions such as how music boosts the intellect, whether music stimulates an area of the brain associated with creativity, if children's musical preferences are wired into the brain or if is culturally determined, or if musicians' brains differ from those of other people. Studies indicate that indeed musicians' brains are different from non-musicians' brains.

Studies suggest that there is a significant difference in brain development among string musicians who have learned to play at an early age (Schlaug, 1999). Tracing neurological development through the child's growth provides additional clues to this quest.

When children start school, they have a facility for rote memory, and simple facts have been imprinted in their minds through songs and musical games. However, some lack comprehension of what they are able to repeat until at least age six (with many boys, eight). Phonics is often learned with musical games and rhythmic process involving matching sounds to different objects, movements, and activities. Sensemaking comes through perception of meaning in patterns. Music greatly assists sensemaking of patterns (Finnerty, 1999). At about age four, the child gets ready for right brain activities, such as creativity, artistic expression, and musical intelligence (Finnerty, 1999). This process is essential in developing thinking skills that will last a lifetime.

Learning occurs through movement and quick emotional associations, until a major leap takes place in brain growth in the elementary years. The brain has already begun to connect with the body by age two through marching, dancing, and developing a sense of physical rhythm. By ages seven and nine, a great spurt of neural integration occurs. "The more music children are exposed to before they enter school, the more deeply this stage of neural coding will assist them throughout their lives" (Campbell, 1997, p. 192).

It is found that musician's corpus callosum, the bridge between the left and right sides of the brain, is larger than in the non-musician's brain. Therefore, music instruction

needs to start before age seven to obtain optimal brain development (Schlaug, 1999). Without active musical involvement, there is a loss of children's musical aptitude between ages five and six. Research shows that musical aptitude becomes stabilized before age nine, and that more consideration must be given to the musical experiences of children between the ages of three and eight (Ball, 1991).

The child commonly develops more complex skills such as listening, processing visual information, and coordinating movement in the brain and mind between second and third grades. Jean Piaget's "concrete reasoning" is formed by and after fourth grade as real conversation in consciousness begins, between the symbols in the outer world and the meaning in the inner world. This is facilitated through the process of phonics, music notation, and math linking the auditory centers to the left and right brains (Campbell, 1997). Additionally, music training improves verbal memory (Chat et al., cited in Schlaug, 1999).

During the ages of nine to eleven, the *corpus callosum*, completes its development, allowing both hemispheres to respond to an event at the same time. (Campbell, 1997; Yakovler & Lecorus cited in Schlaug, 1999). It is also found that no one has been able to acquire absolute pitch after age ten (Schlaug, 1999). Studies have found that the corpus callosum of musicians is thicker and more fully developed than in other people, reinforcing the idea that music enlarges neural pathways and stimulates learning (Campbell, 1997).

The *planum temporale*, an area of the brain associated with language processing located in the left side of the brain, is also more pronounced in musicians (Campbell,

1997; Schlaug, 1999). This area might also "categorize" sounds, suggesting a perceptual link between language and music. Science writer Richard A. Knox notes that studies like this are "part of a growing body of evidence indicating that human brains are designed to process, appreciate, and eventually create music--an activity whose importance for the species scientists are only beginning to appreciate in biological terms" (cited in Campbell, 1997, p.193).

Educators report that by approximately age eleven, the circuits of the neurons that govern perceptual and sensory discrimination go through a change. They also think that children who have not had music in their education may no longer be able to develop the ability to identify pitch and rhythm after this age. From ages eleven to thirteen, a self-consciousness begins to develop as the right hemisphere of the brain becomes harder to access. From thirteen to fifteen, early teen-agers lose the more intuitive and emotional characteristics that were once more prevalent. During these ages, activities that stimulate right-brain function, such as listening to music, are important to full mind and body integration (Campbell, 1997).

Throughout the teen years, thinking becomes more abstract and musical skills more mathematical. By the end of high school or the late teen years, music and other rhythmic activities had a maximum effect on brain development. Although the brain will continue to grow into early adulthood, the potential for the greatest neurological development has passed (Campbell, 1997).

Campbell (1997) emphasizes the power of music on brain development:

The nervous system is like a symphony orchestra with different

> rhythms, melodies, and instrumentations. There are many rhythmic and melodic system that keeps the brain synchronized. When any part of the brain is damaged, the natural rhythms of brain and body are disturbed, and the neurons may fire at the wrong time, or not at all. Often external music, movement, or images help bring the "neurological music" back in tune. Music mysteriously reaches the depths of our brain and body that call many unconscious systems into expression. (p.193)

Thus, parents and educators alike must seriously consider the importance of music education in the development of the child's brain.

Music's Influence on Academics

As music helps the brain develop optimally, the natural beneficial outcomes are evident in the area of academics. Many studies reveal the correlation of music to test scores, grades, and academic achievements. Research suggests that music should assume a place in the regular school curriculum as it shows its effects on academic achievement and contributes to students' education (Kelstrom, 1998). Evidence for the benefits of music education is found in standardized test scores, academic recognition, and high grades.

Researchers have found that music instruction has a positive effect on standardized tests. A study was done in which 5,154 fifth graders took the Comprehensive Test of Basic Skills (CTBS) in 1979. In 1980, another 5,299 fifth graders were tested. Nearly one-fourth of all participants of both groups was enrolled in

the instrumental music program during both years. Music students scored higher on the CTBS in all areas when compared to the total group. The research also indicated that the longer students were in the music program, the higher their achievement was in comparison to non-music students. This study, when replicated in 1986, showed similar results (Kelstrom, 1998).

The benefits of music proceed into higher education. In 1996, the College Entrance Examination Board reported that students with experience in musical performance scored fifty-one points higher on the verbal section of the SAT and thirty-nine points higher on the mathematics section than the national average (Campbell, 1997). Edward J. Kvet, director of the School of Music at Central Michigan University, concludes "Study in music and the other arts generally seems to have a cumulative effect and is undeniably correlated with improvement over time in students' standardized test scores" (Kvet as cited in Campbell, 1997, p.177).

In addition to scoring highly on standardized tests, many of our nation's music students receive disproportionate amounts of academic rewards. From January to July of 1990, the National Center for Educational Statistics, gathered responses from and information about more than 18,000 high school sophomores from almost 1,500 of the nation's public and private schools. Out of the students, only 22.3 percent of the students considered themselves as participating in a school-based musical activity. Students were asked if they were recognized or honored by their school or community for any of several specific achievements in elected official titles, academic honors, and recognition for good

grades. Music participants received more rewards and recognition in each of the three categories (Morrison, 1994).

Lastly, the evidence for music education is evident in the actual grades students received. Students in the study were asked to report how they had performed in mathematics, English, history, and science from the beginning of ninth grade up to the time of the study. Music students demonstrated approximately seven to eleven percent more of reporting As and Bs on their grades in these subject matters as compared to the non-music students (Morrison, 1994). In a 1981 study of Mission Viejo High School students, the overall GPA of music students was 3.59, whereas non-music students had an overall GPA of 2.91. In addition, sixteen percent of the music students attained a 4.0 GPA compared to only five percent of non-music students (Mickela as cited in Kelstrom, 1998).

Thus, it is clear that music has a profound influence upon the academic life of the students and deserves an equal status as a core subject. America can learn from the three top-ranked countries in the world in student scientific achievement-- Hungary, Japan, and Holland, which have music education at the heart of their educational systems. "It would appear that the Hungarians, Japanese, and the Dutch understand something we Americans have yet to fully grasp--that music and the arts are vital to the development and expanse of the human intellect, which in turn results in superior academic and career performance" (Oddleifson as cited in Kelstrom, 1998, p. 38). The benefits of music education within academics are repeatedly and significantly found in the development of mathematics and language arts.

Music's Influence in Mathematics

Research indicates that there is a meaningful connection between artistic abilities and academic abilities, especially in the relationship between musical and mathematical/scientific abilities (Brewer & Campbell, 1991). It is believed that music makes it possible to master difficult abstract concepts faster and with greater retention. In 1993, a study of college students at the University of California at Irvine, was launched to determine the effects of music on spatial intelligence and the ability to form mental images of physical objects. It was found that the students in the study who listened to music by Mozart for ten minutes were found to have higher spatial scores than those who did not listen to any music. The students scored eight to nine points higher on the spatial IQ reasoning subtest of the Stanford-Binet Intelligence test (Rauscher cited in Kelstrom, 1998). Additionally, researchers found that laboratory rats exposed to music by Mozart were able to complete a maze faster and with more accuracy than those exposed to minimalist music, white noise or silence over the same period of time ("Music does boost learning skills, latest research shows," 1998).

Another study reveals that preschool children who received piano keyboard lessons for six months improved their performance dramatically on a spatial-temporal reasoning task, with the residual effect lasting for days. It is suggested that certain math and science concepts thought to be difficult to teach can be learned using spatia' emporal reasoning methods. Music can enhance the "hardware" for the spatial-temporal reasoning in the brain (Grandin et al., 1999).

Link between Music and Mathematics. There is a deep connection between music and mathematics. It is more than a coincidence that both fields are noted for their child prodigies as well as crossover talents evidenced in both fields. For example, Einstein played the violin and Saint-Saens dabbled in mathematics. The musical scale is similar to a neat logarithmic progression of frequencies. There are also similar connections between patterns of notes and patterns of numbers, e.g., found in Godel, Escher, and Bach (Marsh, 1999). While music is viewed as a separate intelligence, there is a high correlation between mathematics and music. Music involves ratios, regularity, and patterns, all of which parallel mathematical concepts (Gardner, 1983).

Other studies reiterate that music instruction increases achievement in mathematical skills (Milley et al., as cited in Kelstrom, 1998). It is believed that studying music enables students to learn multiplication tables and math formulas more easily (Mickela as cited in Kelstrom, 1998). Experience in the study of music facilitates the ability to solve problems that are necessary in some branches of mathematics. Musical instruction techniques that have been used for teaching mathematics experienced great success (Dryden as cited in Kelstrom, 1998). In addition, when a child learns to play the piano, he or she is developing an architecture in the brain in the same area used for reading and mathematical skills (Kosik, 1999). Music instruction increases perception and critical thinking skills, and these skills in turn correspond with logical skills. A person may use the ability for logical thinking that was developed in the music class to solve problems quite unrelated to music (Kelstrom, 1998).

Mathematical Skills Taught Through Music. A New York City program called LEAP (Learning through an Expanded Arts Program) uses art and music to teach basic skills. The program has found great success, especially in reaching economically disadvantaged minority children and children with short attention spans (Dean, 1992). Successful mathematical concepts are taught and reinforced through music inspired lessons.

Simple mathematical concepts are integrated throughout the musically enriched lessons. For instance, as the students develop the rhythms for their songs, they might begin to think in multiples of four. They realize that if they have sixteen beats of music, they then have four sets of four beats. Students also grasp the concept of odd and even as the groups are subdivided into smaller units for particular steps or musical rounds (Dean, 1992).

Musical math, another concept successfully learned through music, can be demonstrated through learning about fractions. This LEAP project also helps students with counting, addition, multiplication, and sets. Students are first familiarized with basic counting and rhythms using a drum or other percussion instrument. At first, the students count evenly with each beat and then they move to counting in sets, e.g., "one, two; one, two; one, two." After experimenting with different stresses and accents in each set, the sets are then combined. This provides the opportunity to reinforce addition and multiplication as students try to figure out the number of beats in the combined sets. For example, the students count out five sets of two and two sets of three to create a line of sixteen beats (Dean, 1992).

arts-based school. Today students spend one-third of the day in music. At fourth grade, they learn to play the piano along with one other instrument. All students learn to sing. This school is open to everyone, musically inclined or not. It now has a waiting list of students, although it is located in an extremely poor area. Today, the school is one of only three schools in the greater New York area where 90 percent of the students are reading at the proper grade level (Mickela & Sautter cited in Kelstrom, 1998).

Learning to Read Through the Arts. Learning to Read Through the Arts (LTRTA) is a program that incorporates the arts as a primary vehicle in the elementary classrooms for teaching reading, writing, thinking and communication skills. This approach creates a high motivation to learn and has proven consistently successful with at-risk students who have difficulty learning through traditional means (Collett, 1992).

In LRTA programs, holistic instruction involving music continues throughout grades K-6. Music teachers move children through this progression by involving them in all learning modalities to penetrate the themes of their current musical discussion. Students record facts, opinions, and feelings in their journal, stressing specific reading, writing, and thinking strategies (Collett, 1992).

Sergey Prokofiev's *Peter and the Wolf* serves as an example of a LRTA unit of learning incorporating music and language arts. The techniques and strategies used in this unit have proven successful in developing music skills simultaneously with improving students' reading and writing abilities (Collett, 1992). First of all, the teacher and the students discuss the use of instruments for characterization. Then they interpret the listener's experience with the timbre, pitch, melody, and rhythm created by each

instrument. They also use the musical composition to interpret the events of the story. Then they also discuss the way the composition portrays the moods and feeling of the different characters. Important music vocabulary is introduced and used later in children's writing (Collett, 1992).

Children are encouraged and led to focus on the characters in the story and how the composer portrays them by instruments, melodic lines, rhythms, and dynamics. As students listen to, interpret, and discuss the music, they learn to analyze the characters and interpret the composition according to the musical clues and interactions in the story. The teacher and the children discuss the characters' behavior and explain how the instruments were chosen to represent the characters. Children then create puppets and act out the story according to the music, allowing them to feel the music. They move to its tempo, melody, and rhythm allowing to further enhance their interpretation of and connection with the characters (Collett, 1992).

Writing skills are reinforced as the children write individually and/or collaboratively the analysis of the characters and the music. They alter the characters' traits thus altering the story. The instrument representing the characters might also change creating a different mood for the story (Collett, 1992). This unit provides a unique experience in interpreting literature through the medium of music. The LRTA program not only develops literacy skills, but also fosters cooperative learning and creativity development.

Exploring Music Through Picture Books. Children's picture books with musical themes explore the world of music and can enrich a whole language curriculum. High

quality literature with music themes brings a dynamic dimension to the literacy program. In addition, musical literature can be added to the classroom curriculum as it fits with an ongoing study of related topics or mere pleasure reading (Lamme, 1990). The most practical approach to integrating literature with musical content into the curriculum is through the thematic studies approach. Musical theme studies using picture books might include the study of musical instruments, singing, performing, dance, and the effects of music on one's feelings and mood (Lamme, 1990). There is a variety of rich literature about performances, music for personal enjoyment, children as musicians, and dance.

Books About Performances. Children enjoy attending performances, listening to others sing or play an instrument. Children of all ages also enjoy performing. There are several books about putting on shows or plays. Children could create puppet shows with musical accompaniment. They can travel to other classrooms and perform their "act." Children can read *The Little Moon Theater* (Haas, 1981) or *The Traveling Men of Ballycoo* (Bunting, 1983) to gain insight about traveling musicians. *Song and Dance Man* (Ackerman, 1988) is a story about a grandfather who performs for his grandchildren using the props from his days as a vaudeville performer. Performances provide many opportunities for literacy activities including making tickets and posters advertising the event, researching information about composers, authors, and instruments to share on the program (Lamme, 1990).

Books About Music for Personal Enjoyment. Children enjoy humming, singing, and listening to music as they work. The books on music for personal enjoyment show the naturalness of being musical. In *The Maggie B* (Haas, 1975), Margaret takes her little

brother, James, on a sea adventure in her very own boat while singing him a sea chant, playing her fiddle, and singing him a lullaby (Lamme, 1990).

Many literacy activities proceed after sharing books about musical enjoyment. Children can write lyrics to their own lullabies or songs and put them to music. They can collect or write jump rope rhymes and create musical accompaniments for them. They can make up songs to sing while they are working or doing their chores. Many books can be read to with appropriate musical background. Further, the books invite children to participate in storytelling (Lamme, 1990).

Books About Children as Musicians. Children can be inspired to take musical lessons as they read about others who are taking lessons. Children who take music lessons can be further inspired by others who take lessons as well. Children can read books about their instruments and write about them. They can write nonfiction reports and directions about how to play their instruments. They might be asked to share their instruments and perform for their own class and/or other classes at their school. Many books with musical themes can serve as the springboard for musical inspiration and performances by children (Lamme, 1990).

Music and Dance. Dance is one of the most powerful forms of communication. It is also a very natural form of self-expression. Children enjoy improvising movements to music and stories through choreographing short dances and creating props to enhance the effects of a story. A physical education teacher read aloud *Barn Dance!* (Martin & Archambault, 1988) prior to teaching fifth graders how to square dance. In this fantasy, a child dreams of waking up in the middle of the night to join the farm animals for a barn

dance. The musical aspect is found in the rhythm of the language in the story. At Back-to-School Night, the parents were invited to square dance with the children. Children read about square dances, wrote out calls, made posters advertising the upcoming event, and created the program. In writing workshop, the dance was one of the most chosen topics to write about in the weeks that followed (Lamme, 1990).

Music's Influence in the Development of Practical Life Skills

Music not only has positive influence in brain development and academics, but offers many beneficial and practical life skills as well. Certain life skills are necessary and make possible for the child to succeed not only at school but also in his personal life. Many practical life skills are effectively learned through music training and are naturally transferred to other areas of the student's life. Through music, students are learning skills that will help them achieve their goals and endeavors throughout their academic and personal lives. Discipline, ability to manage stress, cooperation, appreciation of their culture and the cultures others, and learning to express their feelings are valuable and necessary skills in achieving a balanced and healthy life.

Discipline and Perseverance

Life involves tasks, ranging from doing homework to working full time. Students need to learn the value of discipline and hard work to accomplish their daily tasks and/or their bigger goals in life. Students need to learn not to give up when things become difficult and persevere in order to achieve their goals. Our society is based on instant gratification and through media and other influences, students often have the illusion that

they can achieve their needs and wants without much effort involved. Through music, students learn the value of discipline, perseverance, and the rewards of hard work.

Through music, students learn the value of hard and concentrated work. "Practice is essential to learning music--and anything else, for that matter. I like to say that the time spent practicing is the true sign of virtue in a musician. When you practice, it means you are willing to sacrifice to sound good" (Wynton, 1996, p. 38). Learning to play a musical instrument demands technical mastery through the discipline of regular practice over a period of years. "To repeat, learning insists on the discipline of practice, practice, and more practice" (Brademas, 1995, p. 804). As students experience the positive outcome as the result of their discipline, they will experience the connection of hard work to the success of their accomplishment. Students will be intrinsically as well as extrinsically motivated to continue to exercise discipline to achieve internal and external rewards.

America cannot afford to ignore the virtues that the discipline of music teaches its youth. Music is one area of the curriculum that has already shown itself capable of producing better-disciplined and harder-working citizens. When former students are asked about the subject that best taught them stick-to-effectiveness, the value of hard work, and the importance of self-discipline, many students' answer will be music, at least among those who were fortunate to have participated in a music program (Miller & Coen, 1994).

Stress Management

Life involves stress. Life involves changes and growing events, which bring stress to one's body, mind, and emotions. Stress is a normal part of life; however, how one manages his stress level can help or harm him. Thus, the ability to manage stress is crucial to help cope with the changes life has to offer. Music not only helps one manage his stress level, but also enhances alertness and creativity.

There is clear evidence that music affects brain waves and physiological states. In Japan, a study was conducted to see the influence of music on the stress levels of patients. One group of anesthetized surgery patients listened to music on headphones while another group did not. The "music" group had lower stress levels in the blood (Jensen, 1996).

Music can slow down and equalize brain waves. Brain waves can be modified by both music and self-generated sounds. Ordinary consciousness consists of beta waves vibrating from 14 to 20 hertz. These waves occur when the focus is on daily activities in the external world, as well as when strong negative emotions are experienced. Heightened awareness and calm are characterized by alpha waves cycling from eight to 13 hertz. Periods of peak creativity, meditation and sleep are characterized by theta waves ranging from four to seven hertz. Deep sleep, deep meditation and unconsciousness produce delta waves, ranging from .5 to three hertz. Thus, the slower the brain waves, the more relaxed, contented, and peaceful one feels (Three Reasons to Listen While You Work, 1998).

Like meditation, yoga, biofeedback, and other practices that help to unify mind and body, music with a pulse of about 60 beats per minute, such as certain Baroque, New Age and ambient selections, can shift consciousness from the beta toward the alpha range, enhancing alertness and general well-being. Playing music at school and elsewhere can help create a dynamic balance between the brain's more logical left and the more intuitive right hemisphere--an interplay thought to be the basis of creativity (Three Reasons to Listen While You Work, 1998).

One's heart rate tends to synchronize with the beat of the music. The faster the music, the faster is the pulse. The effects of music on the mind and body are best summarized in these eight areas: (Jensen, 1996, p. 223).

- The effects on muscular energy of tones and scales
- An increase in molecular energy
- The influence of rhythm on the heartbeat
- Changes in metabolism, which affect physical energy
- A reduction of pain and stress and faster healing recovery in patients
- Relief from fatigue and low energy
- The release of emotions, feelings and character
- The stimulation of creativity, sensitivity and thinking

Thus, music helps students learn how to manage stress in positive and nurturing ways. Music allows students to take better care of their overall health enabling them to become more alert, creative, and focused.

Cooperation

Our world is becoming more and more interdependent and our economic survival depends on the skill of cooperating with others. Many businesses are in search for employees with positive people skills who are "team-players". Many jobs and tasks involve the ability to receive and give help and collaborate with other individuals. Through music, students learn the value of cooperation and healthy interdependence.

Of all the disciplines in the curriculum of the American school, music has the greatest experience with cooperative learning. While practicing a musical instrument is often done alone, most musical performances take place in cooperative settings, such as choirs, marching bands, orchestras, musicals or operas. The success of these kinds of performances depends on the cooperation of a group of individuals and sometimes very large groups (Miller & Coen, 1994). Playing in a group magnifies the individual effort into a collective whole. The students learn that other players, instruments, and parts must be accommodated in order to create a cooperative and a successful performance (Brademas, 1995).

Thus, along with learning the basics education has to offer, students need to acquire the fundamental skill of learning to cooperate with one another. This basic skill will help them in their personal as well as professional lives. Through music learning, students become more cooperative and collaborative individuals helping their world become a little more peaceful and harmonic place to live.

Transference of Culture and Values

The media is filled with examples of deteriorating morals in America. Crimes and violence are on the increase and the criminals are getting younger and younger. It is a sad reminder of America compromising its character and losing its cultural values. Many children are no longer growing up with morals to sustain their judgment and conduct (Lickona, 1991). "Our nation suffers from a cultural problem more than a scientific one. Whether we're behind the Japanese is secondary. Our culture is dying from the inside" (Marsalis as cited in Miller & Coen, 1994, p. 459).

Music can assist in reaffirming cultural norms and values. Horace Mann, the founder of the American school system, believed that music was essential to the education of the young for the development of aesthetic appreciation, citizenship, and thinking (Miller & Coen, 1997). Today, music as a subject of study is just as important as it was in Mann's day. It is tragic that the study of music is not considered to be one of the basics of education. Few students in the U.S. have access to institutional or private music instruction involving a balanced and a sequential curriculum. These conditions have a serious impact on American culture. Music is valued more as entertainment than for the development of our cultural life (Miller & Coen, 1994).

The primary purpose to include music in the school curriculum is to disperse its message throughout the culture. Through music, students learn the rich dimensions of their own cultural heritage. In addition, they discover the musical heritage of other cultures which help them find common grounds minimizing national boundaries and language difference (Miller & Coen, 1994). "Music is a powerful manifestation of

cultural heritage. It occurs in a wide variety of styles and types in cultures around the world. Studying music helps students learn about the traditions and modes of thought of their native cultures as well as those of other cultures" (Visual and Performing Arts Framework, pps. 52-53).

A student's education is not complete if it does not also touch his soul. Music can be the key to reaching a student's inner most being. The best teachers have always insisted that music and other arts maintain a central place in the curriculum because all civilizations throughout history have been nourished by the arts. The basic nature of people can be found through their expression of songs, dances, images, and stories (Miller & Coen, 1994).

A teacher's job is not complete if they don't teach their students to have morals and values. Music can guide the students to know the difference between good and bad. "If music means, it is an artistic medium with moral force. If it is of moral force, we then owe our children to teach them to recognize greatness from dross, the spiritual from the dispirited, the transcendent from the momentary sensual gratification of the ear" (Delattre, 1995, p. 25).

A historian reminds us that, "If history tells us anything, it tells us that the United States, like all other nations, will be measured in the eyes of posterity not by its economic power nor by its military might . . . but by its character and achievement as a civilization" (Schlesinger, Jr., as cited in Miller & Coen, 1994, p. 461). The study of music will greatly assist in transferring cultural ideas and values to the next generation.

Expression of Emotions

Today's youth face difficult situations in which they need positive ways to deal with difficult emotions. Unfortunately, they are expressing their feelings through unhealthy and destructive outlets to both themselves and others. Recent National Institute of Drug Abuse (NIDA) reports that drug use among teens is rising. The rate of murder among those 14 to 17 year olds has more than doubled since 1986; and on average six teens die violently in the U.S. each day. "During the past six years, there has been a significant increase in juvenile crime in the most serious categories: murder, rape, robbery, and aggravated assault; homicide arrests of kids ages ten through 14 rose from 194 to 301 between 1988 and 1992" (Gibbs as cited in Suren, 1995, p. 14). Clearly, today's youth need guidance in healthfully expressing their feelings. Music is one powerful means to achieve that goal.

Music offers a natural and instinctual path of expressing strong feelings and emotions. When Americans first entered Somalia, the nightly news programs showed hundreds of starving, naked Somalis and their children waiting for death. Yet remarkably, they sang and tried to move as if to dance. It was the only sustaining force in their last days of survival. Educators of today's youth must enhance children's emotional development giving them opportunities to experience and express their feelings and the power to control that expression (Miller & Coen, 1994). Music instruction assists children to become aware of their feelings, express their feelings through positive outlets, make personal connections through music, and help cope with difficult feelings.

Music's Influence in Identification of Feelings. Music puts feelings into words. It helps children to identify their feelings and become aware of the nature of their behaviors. Music supplies us with the "knowledge of what we ought to feel--when to feel joy and exultation, towering fury, indignation, contempt, awe, humility, indifference, gratitude, love, pity, shame, compassion, admiration, resentment, fear, confidence" (Delattre, 1995, p.23). Through music, children have the safety to feel their feelings and thus are empowered to make healthful choices in expressing them.

Music's Influence in the Expression of Feelings. Music is a communicative and expressive discipline. Music can greatly assist in the emotional development of the child. Music may allow children to express their feelings and cope with them (Tarnowski, 1999). "Music talks to us, and we talk back. The grimaces and contortions made by performers and listeners alike are direct responses to music that moves us, a way for the subconscious mind to respond to music's message" (Pellegrino, 1999). Thus music can be used as a powerful tool to delicately probe at and positively influence the child's emotional state.

Making Personal Connections Through Music. Music's influence lies in the ability to conjure up different interpretations for different people. "Music begins in the mind of its creator and ends in the daydreams of the listener. Its power lies in the ability of a single musical piece to be different things to different people--to become ours, to connect directly to our innermost dreams and desires" (Pellegrino, 1999, p. 5).

Many songs produce endorphin highs and relate to listeners' emotional lives. People create strong and long-lasting associations between those songs and other events

and people in their lives. The songs become anchors triggering a flood of emotions and images. These images have the ability to produce very powerful changes in emotional states. In a world that is becoming more impersonal, there is a rising unmet need for people to connect and personally have moving emotional experiences. Music provides and avenue to meet those needs in a temporary way (Pelligrino, 1999).

Thus people internalize music and are transformed by them. "In 25 years of working with the brain, I still cannot affect a person's state of mind the way that one simple song can" (Pelligrino, 1999, p. 6). Educators can use this powerful tool to help transform students by providing a detour from the destructive path they are on.

Music is a powerful signal carrier. It activates emotions and long term memory and fully engages the brain's receptive states. Powerful emotional reactions are experienced by some listeners. "In other words, motivation and emotion can be triggered with no relationship to the instantaneous state of the environment and the actual response of the organism to it" (Roederer as cited in Jensen, 1996, p. 224). Thus, one must also be cautious and responsible in using music to achieve positive results.

Music's Influence in Helping to Cope. Music offers a means to cope through difficult experiences. Chen Yi is a young Chinese composer who came to the U.S. in 1986. She received a Knight Foundation grant designed to foster collaboration among different music organizations. Through her efforts, music is brought into the daily life of the community. Music has helped her to survive tragic times in her life and has provided hope in the midst of despair:

The love of music helped me survive the dark period, when the

> political tragedy of the Cultural Revolution overtook China. I tried hard then to continue my musical studies, practicing violin at home with the mute attached, because classical music was forbidden. I even took my violin with me into the countryside where I was sent to work for two years, climbing to the top of mountains, carrying on my back hundred-pound loads of rocks and mud for building irrigation walls. Twelve hours a day, I played simple songs to farmers, between excerpts from the standard repertory. I tried to educate the poor children in the village. I started thinking about civilization, the value of the individual lives and the importance of education in society . . . (Yi as cited in Brademas, 1995, p. 805).

These reflections of Chen Yi give compelling voice to the vital role music play in our lives. Music can effectively help children cope with their personal trials and difficulties in their lives. Additionally, music offers hope in midst of the circumstances they are experiencing. Music offers support as children recognize they are not alone in their struggles. Lastly, children are empowered to rise above their situations and seek out good and noble ideas, making their world a better place.

Conclusion

Music instruction is a powerful educational resource and deserves an equal status as a core subject in our schools. Music optimally assists in brain development. It has biological roots, helps the two halves of the brain integrate, and play significant roles in the stages of neurological development. Music also helps children achieve academically. Research reveals music's beneficial link to mathematics, language, and the teaching of values. Children who study music perform better in academic subjects than those who do not study music. In addition, music fosters practical life skills children need to live balanced and rewarding lives. Through music, children acquire discipline, ability to manage stress, cooperation, knowledge about their culture and the culture of others, and ways to healthfully express their emotions. Brademas declares:

> Study of and exposure to the arts [music] are unique in deepening the resources of the intellect and expanding the horizons of imagination. Creativity, adaptability, sensitivity, cooperation, risk-taking, critical thinking, self-motivation, the ability to communicate, dedication to excellence--all these competencies are indispensable if the American genius for innovation is to flourish in the economy of the 21st century. As it happens, these are the very competencies that are enhanced by the study of and practice in the arts [music]. (1995, p. 805)

We can no longer deprive our youth of the vast benefits of music education. It is time to stand up for our students and do what we know is crucial and best for them. We must bring back, defend, and endorse music and music education in our classrooms!

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