

Music Motivates the Movement of the Mind

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Let the word of Christ dwell in you richly in all wisdom: Teaching and admonishing one another in psalms and hymns and Spiritual songs, singing with grace in your hearts to the Lord.

~ Colossians 3:16 (King James Bible)

INTRODUCTION

For the greater part of my life music has been a primary focus for me. I have hummed and hymned with the best of them. None could hum as sweet as “Ma’Dear.” She had her own special way of making the melody last long after the song had past. She would soothe and cradle me to sleep with the sweetest lullabies. I knew then that there was a strong connection between music, emotion, and cognition. This precious time brought a sense of peace. In my infant mind the world was at peace, and it was all right to just enjoy the moment with Mom.

My musical interests doubled during my pre-teens and adolescence. As with most teenagers, I lived and breathe by the sound of my favorite beats. The sound of these beats would send me to worlds unknown. My mind would race with creative thoughts of how to extend this positive flow of ideas. It was as though the sound of these tunes allowed a sense of freedom to occur and a deeper dimension of thought to prevail in my mind. It was as though the music gave me cognitive license to transcend traditional creativeness and access a “gifted” level of intelligence.

Music moves and inspires the best in our psychic to pay attention to the information at hand. It causes us to release the stress of a hectic day and transports us to a mental state where there are no sanctions on exercising creativity. This musically inspired cognition allows freedom to explore or create a song; solve difficult problems; recall historical dates; create chemical equations; and compose feature stories and books. Whatever the mind deems appropriate for this season of thought will be influenced by the sounds of a particular musical selection.

Music acts as a catalyst for transforming our minds from the transformation of our minds from the basic to the more complex reaches of creativity. Music, acting as an intellectual stimulus, affords the mind greater access to its creative powers. With music as a background, this allows the mind to be able to release its creative powers. As a result, the next bestseller or top ten songs may emerge from this heightened mind set. The longer the music plays, the longer the mind is free to dwell in this positive creative mode. According to a report released by *Neuroscience for Kids*, “At its most basic level, music is just sound. Sound produced by vibration. These vibrations can be caused by voices, musical instruments, or by objects hitting each other. Sounds are carried to the ear by changes in air pressure. Music itself has several important characteristics such as rhythm, pitch, timbre, and melody. The ear converts sound waves into movement by vibrating specific parts of the middle ear and inner ear. This movement is then converted into electrical signals that travel in the eight cranial nerves to the brain. From the ear, the auditory information travels first to the brain stem, then to the thalamus, and then to the auditory cortex in the temporal lobe on both sides of the brain” (“The Musical Brain”).

Music's best advantage for educators is its magnetism for young people. It needs no announcement. It needs no persuasion as to its appeal. The varied tunes, lyrics, beats, chords, and harmonies all hold a unique attraction for the teen listener. Thus, it's the musical CD that holds the attention of most young people. It's important for young people to realize that music may be used to increase their test scores and level of learning. This blend of music and facts may lead to an increase in the level of learning. A deeper appreciation of both disciplines may occur as students rush to participate in these energized lessons accompanied by music. Since teenagers still live and breathe by music, it's reasonable to assume that the average teenager would welcome a chance to increase their academic status while listening to a particular musical selection.

Music's impact may be felt globally or locally to remind students of the force of their intelligence and creative powers. Imagine that there is one unique musical selection that brings out the best aspect of the student's intelligence and/or retention of information. Thus, the framing questions are presented as follows: Can listening to a particular musical selection make you smarter? How does the brain process music and information? What are those musical selections that enhance learning?

According to Boxill's theory of music therapy, once contact is made through musical sounds, perception begins to develop. Authorities in brain research and mind—body studies tell us that perception is the beginning of mental activity. "This sensation plus the way experience, learning, and motivation alter the information directed by the senses" (5-7). She further explains that music used functionally not only activates and energizes a person; it also organizes the body and mind into one unit of action.

This unit will teach students how to increase their retention and/or level of learning by listening to a particular selection of musical arrangements that have been tried, tested, and proven to promote learning academic skills. Musical selections known for their positive influence on the mind will be used to promote retention of academic information. This concept allows for creation of a package of lessons accompanied with appropriate musical selections. These special lessons will not only be appealing but, hopefully, will be lessons that the students look forward to rather than lessons they choose to avoid.

HOW MUSIC AFFECTS THE BRAIN

Scientific research suggests that the brain comes alive to the sound of music. The same music that makes the foot tap, the fingers snap and the pulse quicken, stirs the brain at its most fundamental level. Exploring the neurobiology of music, researchers discovered direct evidence that music stimulates specific regions of the brain responsible for memory, motor control, timing and language. The latest findings presented at a meeting of the Society for Neuroscience in Los Angeles, underscores that there is "undeniably biology of music."

There is no question that there is a specialization within the human brain for processing of music. The question remains – How does the brain process and hold musical sounds. Its primary focus is that distinctive pattern of neural activity within the auditory cortex and other areas of the brain imbue specificity to the processing of music. (Tramo in Leutwyler, "Exploring the Musical Brain")

Researchers further suggest that the complexity of the music is the key to higher I.Q. scores. The complexity of the music could enhance the abstract reasoning reinforcing certain complex patterns of neural activities. (Cohen and Miller)

So as not to confuse the terms an explanation of both the brain and the mind will be discussed to clarify this discussion further. The brain is composed of a large organ located in the human skull. It operates every area of our bodies. It controls our listening, thinking, feeling, and all

other bodily functions, whereas, the mind is the consciousness that generates our thought patterns. Both the brain and mind cannot function independently of one another:

The brain can be regarded as being made up of three basic parts. The top outer layer of the brain, the cerebella cortex is the area of the brain responsible for our ability to think, speak, reason and behave purposefully. It is the location of the higher intelligence associated with being human, including that of intuition – perhaps the ultimate in creative thought... The limbic, ‘mammalian’ or middle brain exerts enormous influence over our learning. It is part of the brain we share in common with mammals and respond to information received through our five senses. The brain does not pay attention to anything that is dull, boring and emotionally flat. The limbic brain controls many of our physiological responses, our emotions, significant elements of our memory and our ability to learn. (“Brain Facts”)

In one study, Dr. Robert Zadora and his colleagues at McGill University have been heading studies into the effects of music on the human brain for more than two decades. They have used sophisticated PET and MRI scanners to peer inside the brains to detect where pitch, melody, harmony, and rhythm are processed. There are distinct clusters of cortex that seem to be responsible for each component of music, such as rhythm, or harmony. This study goes on to show that music recruits neural systems of rewards and emotion similar to those known to respond specifically to biologically relevant stimuli. Our brain’s neurons are hard-wired for music—from the cradle to grave. The more we use them, the less we lose them (McKay).

Music involves perception, memory, motor control, and all the learning aspects. It brings together a lot of different functions in a very coherent way. According to McKay, the brain likes to be challenged. It will select the most efficient neural highways to process music, and close those that create musical traffic jams and opening those that make sound flow faster. Although, music activates many parts of the brain, the researchers discovered that everyone has just one area in common that tracked and processed melodies. The brain region, located near the center of the forehead, is called the rostromedial prefrontal cortex. This region, which links to short-term memory, long-term memory and emotions, is different from areas involved in more basic sound processing (Hotz).

The brain functions by sending electrical signals from one place to another. Very small charges pass between nerve cells, accompanied by changes in the electrical potential or voltage. This activity can be measured and displayed as a wave form called brain wave or brave rhythm. A person’s brain is active all the time, waking, and sleeping. These waves are constantly shifting between distinct wave forms which are commonly grouped as deltas, thetas, alphas, or betas. The alphas and betas are said to have the most frequencies occurring as the brain goes through the process of activation (Davidmann). The two major regions of the brain responsible for all this activity are the right hemisphere and the left hemisphere. The two hemispheres are interconnected and communicate. The human mind brings together these abilities and skills into a comprehensive whole whose operation depends on the way in which its parts contribute and cooperate with each other (O’Donnell).

HOW MUSIC AFFECTS THE LEVEL OF LEARNING

Music has a profound impact on the level of learning. It provides a pathway into the brain for accelerated learning to occur. Once the mind has been conditioned by a particular musical selection, it is now open to receive and retain information. According to the APS Science Teaching Forum there is a pyramid that depicts the level of learning. On this learning pyramid the audio concept increases a person understands by about 20 percent. As the music relaxes the mind, the alpha brain waves relax to receive new information.

The power of music to affect learning is incredible. According to Lawrence O'Donnell, "The simultaneous left and right brain action maximizes learning and retention of information." Furthermore, the Center for New Discoveries in Learning explains that learning potential can be increased a minimum of five times by using 60 beats per minute of a particular musical selection. A renowned Bulgarian psychologist, Dr. George Lozano, designed a way to teach foreign languages in a fraction of the normal learning time. Using his system students could learn up to one half of the vocabulary and phrases for the school term. The music helps brain messages to organize and flow and puts the mind into a higher gear.

Most educators would agree that each student has his or her own style of learning information. What those learning styles are and how to apply them to the delivery of information to the student is the key to effective teaching. The goal of all classes should be to insure that the students have understood the given information and are able to receive it, understand it, demonstrate it, and apply it to a particular evaluative task. Now, the teacher is challenged with the task of making sure that the information is delivered in such a way that the students are able to grasp it easily and recall it and/or learn it sufficiently to demonstrate a level of mastery.

Each of the basic learning styles: visual, auditory, and tactile/kinesthetic are identified as follows: auditory learners learn through listening. They learn best by lectures, discussions, listening to what others have to say. Auditory learners interpret the underlying meanings of speech through listening to tone of voice, pitch speed and other nuances. Written information may have little meaning until it is heard. These learners often benefit from reading text aloud and using a tape recorder; visual learners learn through seeing. These learners need to see the teacher's image and facial expressions to fully understand the content of a lesson. They think in turn of images and learn best from visual displays. Finally, the tactile/kinesthetic learners learn through moving, doing, and touching. These learn best through a hands-on approach, actively exploring the physical world around them. They are distracted by their need for activity and exploration. An effective teacher, in tune to each of these learners, will design lessons to meet their needs. These lessons may include the use of music to enhance their learning.

In addition to the learning styles of his students, an effective teacher should also be in tune with the multiple intelligences present within that group of students. The theory of multiple intelligence was conceived by psychologist, Howard Gardner.

Gardner identified the seven ways to demonstrate intellectual ability. Those seven types are visual/spatial; verbal/linguistic; logical/mathematical; bodily/kinesthetic; musical/rhythmic; and interpersonal intelligence. This report will focus on musical rhythmic intelligence. This particular group of learners has the ability to produce and appreciate music. These musically inclined learners think in sounds, rhythms and patterns. They immediately respond to music either appreciating or criticizing what they hear. They are the ideal learners to appreciate the use of music as an effective teaching tool.

Some of the most intelligent scholars of education have used music as a means of creative genius. According to Lawrence O'Donnell, Thomas Jefferson wrote the Declaration of Independence after several violin sessions. Albert Einstein was also driven by music to create and figure out many formulas improvising on his violin. King George I of England overcame many complex problems by using music to stir his creative solutions. Plato described music as "a more potent instrument than any other for education."

In a report by Chris Brewer, Dr. Georgi Lozano and Evelyn Gateva researched ways to increase memory abilities including the use of music in the classroom. They founded that the use of background music during lectures, vocabulary decoding, or group readings creates a highly effective learning environment. Two methods for using music designed to create very different learning environments, were developed through Lozanov's methods. These methods are called

concerts. The Active Concert activates the learning process mentally, physically, and/or emotionally while the Passive Concert is geared to place the student in a relaxed alpha brain wave state and stabilize the student's mental, physical and emotional rhythms to increase information absorption. Both teaching methods result in high memory retention. From their findings, they co-authored *Accelerated Learning*. It is a solid format for creative, whole-brain, multi-sensory teaching methods.

According to Boxill, once contact is made through musical sound, perception begins to develop to develop. Authorities in brain research and mind—body Studies tell us that perception, the beginning of mental activity, is “sensation plus the way experiences, learning, and motivation alter the information directed by the senses” (15). Boxill explains further that music used functionally not only activates and energizes a person; it also organizes the body and mind into a unit of action (23).

TEST RESULTS OF HOW MUSIC AFFECTS LEARNING

Several studies have been conducted on the effectiveness of music on learning. One such study was completed in 1982 by researchers from the University of North Texas. They performed a test on post-graduate students to see if music could help memorizing vocabulary words. The students were divided into three groups. Each group was given tests—a pretest, a posttest, and a test a week after the first two tests. All tests were identical. Group one was read the words with Handel's *Water Music* as background. Group two was read the same words. Group three was only read the words. No background music was played to this group. The results were given a week later. Groups one and two had much better scores than group three. The report concluded that simply listening to music during the test did not absolutely guarantee recall but can possibly improve it.

In another study outlined in the *Accelerated Learning for the 21st Century*, Collin Rose reveals the findings of a group of researchers using music in the classroom to enhance learning. The test was conducted with a group of thirty-three children placed in two groups. One group was given a variety of music lessons and the other group was given none at all. Following a short period of time the music students scored 80% higher than does without the music. Other studies have shown similar results. One such research headed by Researcher Rauscher and colleagues gave a group of thirty-six undergraduate students spatial reasoning tests on a standard IQ test. Prior to taking the test the students listen for ten minutes to Mozart's Sonata for two in D major, K. 488. The results were 119, 111, and 110 respectively (Rose 181-183, 185-187).

Another study headed by Steven Smith of Texas A&M University. Suggest that the use of music to induce context-dependent memory (CDM) is better if testing occurs in the original learning context rather than in a different context. In this study it is clear that the setting as well as the setting plays a part of the test results.

The researchers suggest that the complexity of the music is the key to the higher I.Q. scores. The intricacies and complexity of the music could enhance abstract reasoning by reinforcing certain complex patterns of neural activity. One researcher proposed that music primes the areas of the brain that may be involved in other tasks (Coen and Miller).

REACTIONS TO MUSIC ENHANCEMENT

The idea of music to promote or enhance learning is not a new concept. It has simply been underused or disregarded as a viable teaching tool. The fact that it is so much a part of our everyday lives causes us to overlook its significance. We are blind to its benefits as a tool for teaching. We wait for the advertisers, movie producers, and sport promoters to show us the benefits and the billions that music reaps every year. The truth is students want to be where the

music is the loudest and most exciting. Educators are only now reacting to the joyful sounds of learning. Community leaders are reacting with positive comments:

- “Every student in the nation should have an education in the arts.”—A statement issued by the American Association of School Administrators.
- “Studying music encourages self-discipline and diligence, traits that carry over into intellect that lead to effective study and work habits.”—Michael E. DeBakey, Leading Heart Surgeon).
- “Music is about communication, creativity, and cooperation, and by studying music in school students have the opportunity to build these skills, and enrich their lives.”—Bill Clinton, former President of the United States of America
- “During the Gulf War, the few times I had for relaxation, I always listened to music. It gave me great peace of mind.”—Norman Schwarzkopf, General, U.S. Army, retired. (Smith)

There are several pilot programs underway to promote the cry for more music in the schools to enhance learning among students. One such program is operating in San Francisco schools under the banner of Achieving through Music operating from James Lick Middle School. The program is experiencing tremendous success. The results were reported:

- Grade average for the intervention group improved from 74.3% to 77%.
- Grade averages for the control group declined from 74.1% to 70.8%.
- Average number of absences improved from 10.8% to 5.0%.
- Average number of dropouts improved from 15% to 10%. (“Achieving through Music”)

Another program is Music in School with the Oakland, California School District. They are collaborating with area schools to develop a professional model. This district received a \$40,000 grant from the National Endowment of the Arts to pilot their music program. These funds are available to all schools interested in promoting music in the classroom.

LESSON PLANS

Lesson One - Memorizing SAT Vocabulary

Our focus on the SAT vocabulary is a priority due to the urgency of the students preparing to test in October. Students are prepared in advance with vocabulary skills to pass the test sufficiently. They will be given practice drills, sentence completion exercises, analogies, and crossword puzzles.

Materials

CD player
SAT Vocabulary CD
SAT Vocabulary Flash Cards
Baroque Musical Selection
Paper and Pens

Objective

Our first objective is to have students recall the SAT vocabulary and definitions. The students will apply the definitions to statements or stories that they will compose. A connection will be made with this vocabulary and the actual SAT vocabulary test.

Activity One

Students will be asked to listen for ten minutes to Baroque music and SAT vocabulary played at the same time. Following the ten-minute musical/vocabulary exercise, the students will be quizzed about the vocabulary. Verbal and written responses will be accepted.

Activity Two

Students will be asked to apply these SAT terms to a crossword puzzle. The teacher will distribute crossword puzzles to students and allow 20-minutes for a pair-share exercise with the puzzles. Background music will play softly during this activity.

Lesson Two - The Writing Process

Our focus for this lesson is centered on the TAKS test. Students are required to pass the state mandated TAKS test. An important part of that test is writing in response to a given prompt. Students are expected to plan, organize, and express their written thoughts in a two-page essay. They are also required to read two selections and respond to a series of multiple-choice questions and one open-ended response. Additionally, they are asked to revise and/or edit a text.

Materials

Lap-Top Computer
CD player
CD of Classical Music
Paper and pens
Chart Tablet
Writing Process Posters

Objective

Students will learn the steps to the Writing Process and know how to apply those steps to produce an effective two-page essay for the TAKS test. Additionally, students will learn to respond to an open-ended question and a series of multiple-choice questions.

Activity One

Students will view a power-point presentation of The Writing Process as they listen to background music at the same time. Students will respond to a review of questions about the Writing Process. Students will be given a topic and asked to write a two-page essay about this particular topic. During this writing exercise, a selection of background music will be playing. Students will be given 30 minutes to produce this essay.

Activity Two

Students will be asked to read their essays with a partner and share their reactions with their partners. They will revise and edit each other's paper. They will discuss the errors and make corrections together. A classical musical selection will be playing in the background.

Lesson Three - Reading Literature

Our focus in reading literature is to know the elements of a literary selection. Students should be able to identify the main idea, supporting details, main character, and plot of the story. They should be able to identify the theme and conflict of the story. They should also be able to respond to a series of multiple-choice questions concerning the text.

Materials

Overhead Projector
Transparencies of SQ3R Method
Transparencies of Various Stories
CD player
CD of Classical Music

Objective

Students will learn the steps to the SQ3R Reading Method. Students will learn to survey the text, question the text, read the text twice, recite the text, and remember the assigned text.

Activity One

Students will be asked to read an excerpt of a literary selection. Students will be asked to scan the text, question the information (what/who/when/where/why/how), read the selection word for word, and recite the information and reflect on the reading. The assigned text will be on a transparency and reflected on the overhead. During the silent, background music will be playing on a low volume. Following the reading of this selection, students will be asked a series of questions to respond to verbally and in writing. A discussion of the text will follow.

Musical Selections that Enhance Learning

The following selections were selected based on their beat patterns of 50-80 beats per minutes. This particular pattern was deemed as most effective for learning to occur. This list is endless. Other cultural classic may be included.

- 1) Handel's *Water Music*
- 2) Mozart's *Sonata for Two Piano's in D Major*
- 3) *Velvet Dreams*, Daniel Kobialka
- 4) *Celtic Fantasy*, Daniel Kobialka
- 5) *Baroque Music to Empower Learning and Relaxation*
- 6) *Mozart and Baroque Music*
- 7) *Mozart Effect*
- 8) *An Du*
- 9) *Accelerating Learning*, Steven Halpern's
- 10) *Pianoforte*, Eric Daub
- 11) *Medicine Woman I or II*, Medwyn Goodall
- 12) *Oceans*, Christopher Peacock
- 13) *Fairy Ring*, Mike Rowlands
- 14) *Living Music and Touch*, Michael Jones
- 15) *Dance of Renaissance*, Richard Searles
- 16) *Emerald Castles*, Richard Searles
- 17) *Celtic Destiny*, Bruce Mitchell
- 18) *Sun Spirit*, Deuter
- 19) *The Four Seasons*, Antonio Vivaldi
- 20) *Boundaries. Echoes of Incas*, Ventana al Sol.

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